

Ref 13



**CHEMETCO, INC.  
1198010003--MADISON COUNTY  
ZINC OXIDE SPILL  
REMEDICATION PLAN**

**PREPARED FOR:**

**Chemetco, Inc.  
Hartford, Illinois  
1198010003 -- Madison County**

**RECEIVED  
APR 28 1997**

**APRIL 1997**



## TABLE OF CONTENTS

1. Introduction
2. Facility Description
  - 2.1 Facility Address and Identification Numbers
  - 2.2 Description of Spill Area
3. Overview of Removal Procedures Completed
  - 3.1 Containment
  - 3.2 Dewatering
  - 3.3 Zinc Oxide Removal from Containment Area #3 - Long Lake
  - 3.4 Vegetation Removal
4. Sampling and Analysis of Containment Areas 3 and 4
  - 4.1 Analytical Results Containment Area #3
  - 4.2 Analytical Results Containment Area #4 (Partial)
5. Proposed Waste Removal Procedures from Containment Areas 1 and 2
  - 5.1 Containment Area 1
    - 5.1.A - Characterization of the Zinc Oxide
    - 5.1.B- Removal Procedures
  - 5.2 Containment Area 2
  - 5.3 Containment Area 4
6. Proposed Sampling and Analysis to Demonstrate Closure from Containment Areas 1 and 2
  - 6.1 Containment Area #1
  - 6.2 Containment Area #2
7. Groundwater Monitoring
8. Remediation Schedule

## **ATTACHMENTS**

- 1 Revised Work Plan - 10/10/96
- 2 Corp Permit and Application
- 3 Initial Excavation Sample Results
- 4 Sampling and Analysis Plan - Zinc Oxide Spill
- 5 Photographs
- 6 Analytical Results from Containment Areas 3 and 4
- 7 Variance Request to Bureau of Water
- 8 TCLP Results - Tree Roots
- 9 Groundwater Sampling and Analysis Procedures

## **FIGURES**

- 2-1 Site Location
- 2-2 Spill Location and Containment Areas
- 3-1 Sediment Sample Locations
- 4-1 Sample Locations
- 5-1 Zinc Oxide - CA#1 Assay Locations
- 5-2 Zinc Oxide Flow Diagram
- 6-1 Revised Sample Location CA#2
- 7-1.1 Groundwater Divides
- 7-1.2 Private Well Locations
- 7-2.1 Cross Section
- 7-2.2 Sand Lense Outcrop
- 7-3.1 Groundwater Flow 1/96
- 7-3.2 Groundwater Flow 4/96
- 7-3.3 Groundwater Flow 7/96
- 7-3.4 Groundwater Flow 10/96
- 7-3.5 Proposed Well Locations
- 7-3.6 Well Construction Diagram
- 7-3.7 Typical Boring Logs
- 7-3.8 Well Completion Report
- 8-1 Remediation Schedule

**CHEMETCO, INC.**  
**1198010003 – MADISON COUNTY**  
**REMEDIATION PLAN FOR ZINC OXIDE SPILL AREA**  
**PHASE I - MATERIAL REMOVAL**  
**APRIL, 1997**

**1.0 Introduction**

A spill of zinc oxide was reported by Chemetco, Inc. (Chemetco) to the National Response Center and the Illinois Emergency Management Agency on September 19, 1996. The spill was found during a routine RCRA inspection conducted by the Illinois Environmental Protection Agency (IEPA) on September 18, 1996. Personnel from the United States Environmental Protection Agency (USEPA) were also present during the inspection. During the inspection, material that appeared to be zinc oxide was discharging from a pipe located south of Oldenburg Road. Sample results confirmed the spilled material was zinc oxide.

The IEPA has requested a RCRA closure plan be submitted for the spill area. In the course of negotiation, Chemetco has agreed to close the area in accordance with RCRA closure protocol. Submittal of this plan is not in any way an admission of Chemetco's behalf that the spill area is subject to RCRA requirements. The spill remediation plan will be submitted in two phases. Phase I will discuss Material Removal. Phase II will focus on Demonstration of "Clean Closure". This plan addresses Phase I - Material Removal.

## **2.0 Facility Description**

The Chemetco facility was constructed in 1969 and commenced production of anode copper, cathode copper, crude lead-tin solder, zinc oxide and slag in 1970. The Chemetco facility is located within a primarily agricultural, light residential area south of Hartford and is bounded on the west by major, heavily traveled rail and highway routes and on the south by a limited use secondary road. More specifically, the 200+ acre plant site is in the Southeast 1/4, Section 16, Township 4 North, Range 9 West of the Third Principal Meridian, in Madison County (see Figure 2-1).

### **2.1 Facility Address and Identification Numbers**

Chemetco, Inc.  
Route 3  
Hartford, IL  
IEPA #1198010003  
USEPA # ILD048843809

### **2.2 Description of Spill Area**

The spill was discovered during an IEPA inspection on September 19, 1996. CSD Environmental was retained on September 20, 1996 by Chemetco to conduct remediation of the spill area. During excavation activities layers of zinc oxide material were found to a depth of 6 feet in Long Lake indicating the area appeared to be impacted from historical management of zinc oxide.

This remediation plan addresses source removal of zinc oxide from a spill area approximately 300 feet long by 450 feet wide. Initially the spill area was reported to be approximately 600 feet wide, however, the area has now been surveyed and confirmed to be only 450 feet wide. To contain the spill, four separate containment areas were constructed within the impacted area. Containment Area # 1 contains the zinc oxide removed from the other three containment areas. Containment Area #1 measures approximately 200 x 370 feet and has approximately 3,000 to 5,000 cubic yards of zinc oxide stored within it. Containment Area #2 measures approximately 300 x 50 feet (initially reported as 90 feet) and was constructed to temporarily hold diverted water from a portion of Long Lake. Approximately 575,000 gallons of water is estimated to be stored in Containment Area #2. Containment Area #3 measures 250 x 200 feet. Zinc oxide was removed from Containment Area #3 and was placed into Containment Area #1. Containment Area #4 measures 200 x 300 feet and was not affected by the spill to the degree that the other containment areas were. Any visible zinc oxide found in Containment Area #4 was placed into Containment Area #1. Debris in the form of tree stumps and rock is stockpiled in Containment Area #4. Refer to Figure 2-2 for the spill location and the containment areas.

### **3.0 Overview of Removal Procedures Completed**

A work plan for the immediate response to the spill was submitted by CSD Environmental Services, Inc. (CSD) to the Illinois EPA on September 25, 1997. On September 30, 1997, the IEPA responded to the plan requesting additional information. A revised work plan was submitted on October 10, 1996 addressing their concerns. Attachment 1 contains a copy of the October 10, 1996 Revised Work Plan. The Work Plan addressed temporary containment and removal of the zinc oxide from Containment Area #3.

The spill area was inspected by CSD Environmental to evaluate the best options for remediation. Visual criteria was used to delineate the extent of the spill area. Initially a diversion channel was constructed to reroute the lake past the spill area. A Section 404 Permit, of the Clean Water Action (CWA), was received by the Army Corp of Engineers (Corp) to build a diversion channel and two dams on Long Lake. Attachment 2 contains a copy of the permit and permit application received from the Corp.

#### **3.1 Containment**

The following items were constructed to achieve containment of the spill area:

- A road was constructed using limestone rock to allow heavy equipment and trucks access to the spill area. The road was advanced over impacted soil and will be removed to enable soil remediation after the zinc oxide from Containment Area #1

is removed. The north side of the road was lined with a 8 to 10 millimeter thickness polyethylene plastic to inhibit water from flowing under the dam. Limestone rock was placed on top of the liner to hold it in place.

- An earthen berm approximately 3 to 5 feet in height was constructed around the entire perimeter of the spill area. Surface water was diverted around the impacted area through a drainage ditch.
- A diversion channel 25 feet wide and 3 to 5 feet in depth was constructed to reroute water in Long Lake around the spill area. Two dams were constructed on Long Lake to assist in the diversion.

### **3.2 Dewatering**

To remove the zinc oxide from Long Lake (Containment Area #3), dewatering was required. An impoundment was constructed within the contained spill area to hold water pumped from Containment Area #3. Prior to constructing the impoundment, any visual zinc oxide within the area was pushed with a bulldozer to the southwest corner of the spill area. An impoundment approximately 300 feet long by 50 feet wide was constructed. This impoundment was labeled Containment Area #2. The construction of Containment Area #2, in effect created two additional containment areas within the larger bermed area, Containment Areas #1 and 4. Containment Area #1 contained the largest percent of zinc oxide from the spill, therefore it was decided this area would be best suited to contain the zinc oxide to be removed from Long Lake. Containment Area #4 was not as significantly impacted from the spill as the other others. Containment Area #4 was used for storing

vegetation removed from the spill area and rock removed from the temporary pads constructed within Long Lake to allow equipment access. The portion of Long Lake to be dewatered and remediated was labeled Containment Area #3. Refer to Figure 2-2 for the spill locations and the containment areas.

### **3.3 Zinc Oxide Removal from Containment Area #3 (Long Lake)**

The water from Containment Area #3 was transferred to Containment Area #2 using portable trash pumps. Two pads were constructed of limestone rock on the north side of Long Lake to allow the trackhoe access to the south side of the lake. All vegetation and debris (logs) within Long Lake were removed and stockpiled within Containment Area #4 for further handling. After the vegetation was removed and the dewatering was completed, excavation of impacted soils was initiated. Visual criteria was used to determine the initial excavation depth. Visual inspection of the soil revealed the zinc oxide extended to a depth of approximately 6 feet indicating the area was impacted from historical management of zinc oxide. Three sediment samples were collected after the initial excavation to determine if additional excavation was necessary. Refer to Figure 3-1 for the location of the sediment samples. Table 1 summarizes the analytical results. Copies of the analysis are provided in Attachment 3.

### **3.4 Vegetation Removal**

To remove the zinc oxide from the impacted area, it was necessary to remove standing and fallen trees to allow equipment access to the area. The trees removed were

cut down with chain saws above the roots. If visible zinc oxide was detected on the tree, the cut was made above the visual point. The trees were fed through a large tub grinder for shredding. The shredded material was stockpiled in Containment Area #4 for further handling. The tree roots were removed by excavation and also placed in Containment Area #4. See Section 5.3 for information regarding removal of these items. The tub grinder was decontaminated using a high pressure steam wash before leaving the job site. All decontamination waters were containerized in a 475 gallon polyethylene tank and transferred to Containment Area #2, pending future on-site treatment. Refer to Section 5.2.

**Table 1**  
**Soil Samples - Long Lake - After Initial Excavation**  
**October 9, 1997**  
**Chemetco, Inc.**

Sample Number:	Long Lake 1	Long Lake 2	Long Lake 3
Parameter:			
Total Metal Analysis in mg/kg			
Cadmium	56.3	8.3	16.1
Lead	27.1	75.5	333
Zinc	519	498	716
TCLP Metal Analysis in mg/l			
Cadmium	<0.004	<0.004	1.3
Lead	<0.042	<0.042	10.4
Zinc	4.5	4.9	77.1
IEPA Clean Up Objectives			
Cadmium	0.005		
Lead	0.0075		
Zinc	5.0		

Clean up objectives as proposed in Title 35: Environmental Protection: Subtitle G: Waste Disposal: Chapter I; Pollution Control Board; Subchapter F: Risk Based Cleanup Objectives; Part 742 - Tiered Approach to Corrective Action Objectives; Class I - Migration to Groundwater Route Values. Those TCLP values exceeding the objectives are highlighted. No objectives are identified for total metal values.

The sample results confirmed the visual criteria used to determine the initial excavation depth was an excellent indicator to identify the extent of contamination. Additional

excavation was conducted in the area of sample 3. The temporary pads constructed to allow access across Long Lake were removed and stockpiled in Containment Area #4.

A Sampling and Analysis Plan was submitted to the IEPA on October 10, 1996. The sampling and analysis plan identified the sample locations and sampling parameters to determine closure. The plan was verbally approved by the IEPA on October 21, 1996. Refer to Attachment 4 for a copy of the Sampling and Analysis Plan.

Photographs documenting the containment of the spill area, construction of containment area #2 and removal of the zinc oxide from Containment Area #3 (Long Lake) are provided as Attachment 5.

#### 4.0 Sampling and Analysis of Containment Areas 3 and 4

Sampling of Containment Area # 3 and a partial area of Containment Area #4 was conducted on October 23, 1996. Sampling was conducted in accordance with the approved Sampling and Analysis Plan except for the following changes:

- The area of Containment #3 was measured and found to be 28,600 ft<sup>2</sup> instead of 50,000 ft<sup>2</sup>. The grid interval was changed to 50 feet to account for the decrease in the square footage.
- Sampling was conducted using a skid loader and five foot stainless steel split spoon samplers where possible. The original sampling and analysis plan indicated sampling would be conducted using a hand auger. The use of the split spoons allowed for a five foot sample to be collected at each sample location. Three split spoons were used to speed in sample collection. Each split spoon was decontaminated between samples by washing withalconox, followed by steam cleaning and finally a tap water rinse.

Sampling began with CSD Environmental and Western Environmental personnel establishing the grid interval and marking each grid node with a construction stake. Each grid node was given a sample number identifying the sample location. Numbering corresponded to the Containment Area. For example, all samples from Containment Area #3 were identified as CA-3-#. Samples from Containment Area #4 were identified as CA-4-#. Samples were collected to demonstrate closure from Containment Areas 3 and 4. Only

a portion of Containment Area #4 was sampled since the remainder of the area was flooded. Samples will be collected from Containment Areas 1, 2, and the remainder of 4 when the zinc oxide and water within containment is removed. Samples were collected at depths of 6" and 18" below grade from all sample locations. In addition, at the request of the IEPA, samples from a depth of five feet were collected at three locations within Containment Area #3; CA3-3; CA3-4 and CA3-7. Figure 4-1 indicates the sample locations. The skid loader was not able to reach sample locations 6 and 9 within Containment Area #3 therefore, samples CA3-6 and CA3-9 were collected using a hand auger. The depth of the augured hole was measured with a tape measure to ensure samples were collected from the correct depths. Decontamination procedures of the hand auger were identical to those of the five foot split spoons.

Each sample was placed into laboratory provided glass jars. The jars were labeled indicating the sample location and depth, company name, and samplers initials. The jars were immediately placed into a pre-chilled cooler of approximately 4 degrees C. Each cooler was provided with a chain of custody form. The samples were hand delivered to Prairie Analytical Systems, Inc. in Springfield, Illinois by CSD personnel within 24 hours of sample collection.

All rinse waters used for decontamination were captured and containerized into a 475 gallon polyethylene tank. The rinse waters were transported to Containment Area #2 pending future on-site treatment. Refer to Section 5.2.

#### **4.1 Analytical Results - Containment Area #3**

Table 2 summarizes the sample results collected from Containment Area 3. The sample results from Containment Area #3 indicate the majority of the zinc oxide was removed. Analytical results are provided in Attachment 6. Only one sample, CA3-7 collected from a depth of 6" exceeded the clean up objective of 5 mg/l for Zinc. Zinc was detected at 8.1 mg/l in this location, however, the deeper sample collected at 18" from only detected zinc at 0.21 mg/l. Lead was detected in one location, CA3-1-6" at 0.012 mg/l above the detection limit of 0.0075 mg/l. The deeper sample collected at 18" from CA3-1 detected lead at <0.001 mg/l. Cadmium was detected above the detection limit of 0.005 mg/l in seventeen of the twenty two samples; at the detection limit in two samples; and less than the detection limit in three samples. The highest level of cadmium detected was at 0.48 mg/l in sample CA3-7-6". Most of the exceedences of the cadmium standard were within fifteen parts per million of the standard. Chemetco proposes to use Tier 2 and if necessary, Tier 3 of the Tiered Approach to Clean Up Objectives to establish site specific clean up objectives. Phase II of Remediation - Demonstration of Clean Closure will contain the Tier 2 and 3 Analyses.

#### **4.2 Analytical Results - Containment Area #4**

Table 3 summarizes the sample results from Containment Area #4. Seven samples exceeded the clean up objective of 0.005 mg/l for Cadmium; two samples exceeded the objective of 0.0075 mg/l for lead; and four samples exceeded the objective of 5.0 mg/l for Zinc. The highest exceedence for Cadmium at 0.107 mg/l was found at CA4-4 at a depth of 18". The highest exceedence for Lead at 0.472 was found at CA4-4 at 6" in depth. The highest exceedence for Zinc at 11.7 was found at CA4-4 at 6" in depth. Chemetco proposes to use Tier 2 and if necessary, Tier 3 of the Tiered Approach to Clean Up

Objectives to establish site specific clean up objectives. Phase II of Remediation - Demonstration of Clean Closure will contain the Tier 2 or 3 Analysis. If it is determined after the Tier 2 or 3 analyses is conducted that the soil samples still do not meet the objectives, additional soil removal or stabilization in place may be conducted.

Table 2  
Soil Sample Results  
Containment Area #3  
Chemetco, Inc.  
October 24, 1996

Sample Number	Cadmium mg/l	Lead mg/l	Zinc mg/l
Clean up Objective from 742: Table A	0.005	0.0075	5.0
CA3-1-6"	0.013	0.012	<0.002
CA3-1-18"	<0.001	<0.001	<0.002
CA3-2-6"	<0.001	<0.001	<0.002
CA3-2-18"	<0.001	<0.001	<0.002
CA3-3-6"	0.005	<0.001	0.04
CA3-3-18"	0.007	<0.001	<0.002
CA3-3-5'	0.020	<0.001	<0.002
CA3-4-6"	0.007	<0.001	<0.002
CA3-4-18"	0.005	<0.001	<0.002
CA3-4-28"	0.008	<0.001	<0.002
CA3-4-5'	0.007	<0.001	<0.002
CA3-5-6"	0.010	<0.001	<0.002
CA3-5-18"	0.006	<0.001	<0.002
CA3-6-6"	0.066	<0.001	<0.002
CA3-6-18"	0.061	<0.001	<0.002
CA3-7-6"	0.48	<0.001	8.1
CA3-7-18"	0.009	<0.001	0.21
CA3-7-5'	0.108	<0.001	1.32
CA3-8-6"	0.010	<0.001	<0.002
CA3-8-18"	0.010	<0.001	0.24
CA3-9-6"	0.029	<0.001	0.70
CA3-9-18"	0.047	<0.001	<0.002

Those TCLP values exceeding the objectives are highlighted.

Table 3  
Soil Sample Results  
Containment Area #4  
Chemetco, Inc.  
October 24, 1996

Sample Number	Cadmium mg/l	Lead mg/l	Zinc mg/l
Clean up Objective from 742: Table A	0.005	0.0075	5.0
CA4-1-6"	0.018	<0.001	<0.002
CA4-1-18"	<0.001	<0.001	<0.002
CA4-2-6"	0.048	<0.001	<0.002
CA4-2-18"	0.014	<0.001	0.53
CA4-3-6"	<0.001	<0.001	<0.002
CA4-3-18"	0.005	<0.001	<0.002
CA4-4-6"	0.053	0.472	0.16
CA4-4-18"	0.107	0.047	1.17
CA4-5-6"	<0.001	<0.001	3.97
CA4-5-18"	0.032	<0.001	<0.002
CA4-6-6"	0.014	<0.001	<0.002
CA4-6-18"	<0.001	<0.001	<0.002

Those TCLP values exceeding the objectives are highlighted.

## **5.0 Removal Procedures for Containment Areas 1 and 2**

### **5.1 Containment Area #1**

The zinc oxide and soil contained in Containment Area #1 (CA#-1) are recyclable materials due to level of lead, zinc and precious metals contained within. Chemetco currently ships zinc oxide as a by-product to ELMET in Berango Spain for further metal recovery. Chemetco is also currently negotiating with two additional customers for the sale of zinc oxide material. Chemetco intends to remove all the zinc oxide stored within Containment Area #1 and ship the material to either ELMET as a by-product or to Hydromet in Newman, Illinois as a hazardous waste. The characterization will be dictated by ELMET's specifications.

#### **5.1.A. Characterization of the Zinc Oxide**

To ensure the material will meet ELMET'S specifications, samples of the material were collected. A sampling grid consisting of 35 feet in the east - west direction and 40 feet in the north- south location was arranged. The south portion of the zinc oxide was estimated to be approximately 6 feet higher than the north portion, therefore, samples from the south side of CA#1 were collected at each grid interval from depths of 2, 4, and 8 feet. Samples were collected at a depth of 2 and 4 feet from the north portion. Refer to Figure 5-1 for sample locations. The samples were collected using a hand auger. Sample depth markings were placed on the extensions of the hand auger to ensure correct sampling depths. The samples were placed in one quart ziploc bags and delivered to MIDCO labs in St.

Louis, MO for metal assaying. The sample results will be sent to ELMET for pre-acceptance. If any of the samples are denied by ELMET, the zinc oxide from the corresponding sample location will be shipped as a hazardous waste under a manifest to Hydromet for reclamation.

#### **5.1.B Removal Procedures**

Prior to removal of any zinc oxide, the water in Containment Area #1 will be pumped into Containment Area #2 to initiate the drying process. No removal can occur until the water currently stored within Containment Area #2 is removed to allow room for the additional water from Containment Area #1. See Section 5.2 regarding water removal from Containment Area #2. Due to the moisture content of the material, three different removal procedures are documented below for the zinc oxide removal. Zinc oxide meeting ELMET's specifications will be transferred into barges. The barges will transport the material to either the Port of New Orleans or to Chicago where the zinc will be clamshelled into a ship for overseas transportation. Material deemed not acceptable to ELMET will be transported as a hazardous waste to Hydromet for reclamation.

1. The zinc oxide will be loaded "as is" into polyethylene lined trucks for transportation to either the Hartford Terminal or Hydromet.
2. The zinc oxide will be spread out in Containment Area #1 to allow natural drying of the material. Care will be taken to ensure the material is not over dried to become an air emission source. After drying, the material will be loaded into

polyethylene lined trucks and transported to either the Hartford Terminal or Hydromet.

3. If the material is found to need further dewatering prior to shipment, the material will be transported to Chemetco's ponds. The material will flow from the ponds to the settling cells and to the filter press for pressing. Refer to Figure 5-2 for a flow diagram of the material through the plant. After pressing the material will be loaded into polyethylene lined trucks and transported to either the Hartford Terminal or Hydromet.

## **5.2 Removal Procedures Containment Area #2**

Containment Area #2 measures approximately 300 x 90 feet and was constructed to temporarily hold water from the diverted portion of Long Lake. Prior to constructing the impoundment, any visual zinc oxide within the area was pushed with a bulldozer to the southwest corner of the spill area. Approximately 575,000 gallons of water is estimated to be stored in Containment Area #2. A sample of the water contained within Containment Area #2 was collected on October 11, 1996 and analyzed for Chemetco's NPDES discharge parameters pursuant to Chemetco's NPDES Permit #IL0025747. Table 4 summarizes the analytical results. Exceedences of the General Use Standards were found for Cadmium, Copper, Iron, Manganese, Lead, Suspended Solids and Zinc. CSD verbally requested approval from the IEPA, Bureau of Water, on October 21, 1996 for an emergency discharge of the water within Containment Area #2 to Long Lake. This request was denied by the IEPA, Bureau of Water on October 26, 1997. In response to the denial, CSD collected an additional sample of water from Containment Area #2 and analyzed for

dissolved cadmium, copper, iron, lead, manganese and zinc. Sample results indicated after filtration cadmium, manganese and total suspended solids exceeded the general use standards. The sample results are provided in Table 5. On November 27, 1996, CSD submitted a letter requesting the Agency's assistance in discussing disposal options for the impounded water. The IEPA responded by letter on December 6, 1997 denying a provisional variance request for discharge of the water. In response to the IEPA's variance denial, a formal request for a variance to discharge the water after treatment was requested by Chemetco on March 20, 1997. A copy of CSD's November 27, 1996 letter, the IEPA response, and Chemetco's March 20, 1997 request for a variance is provided as Attachment 7. The IEPA denied the request for a provisional variance on March 31, 1997. A meeting was held with the Bureau of Water on April 9, 1997 to discuss the variance denial. The Bureau of Water requested CSD submit an NPDES application to discharge the water. CSD explained that due to time constraints we were requesting the variance to discharge the water. CSD informed the Bureau that CA#2 needed to be dewatered in order to begin zinc oxide removal in CA#1. The Bureau again refused the variance request. In response to the variance denial, an application for an NPDES permit to temporarily discharge the impounded water was submitted to the IEPA on April 16, 1997. If the NPDES request is approved by the IEPA, a temporary wastewater treatment unit will be mobilized to dewater Containment Areas #1, 2 and 4. Refer to the process description in Attachment 7 for a description of the proposed temporary treatment. If the Bureau of Water denies the NPDES permit request, CSD will request the Bureau of Water to allow treatment to be conducted after construction of the permanent wastewater treatment plant. Chemetco is currently submitting an NPDES permit application to construct and operate a permanent storm water treatment plan to treat all storm water at the plant. This application is anticipated for submittal by May 31, 1997.

To aid in drying and removal of zinc oxide in Containment Area #1 water will be pumped from Containment Area #1 to Containment Area #2. Containment Area #2 will continue to be used to store water until the zinc oxide material from Containment Area #1 is removed. If zinc oxide removal from CA#1 needs to begin before the

Table 4  
 Water Sample Result from Containment Area #2  
 Collected on October 11, 1996  
 Analyzed for NPDES Discharge Parameters  
 Total Metals

Parameter	Result in mg/l	General Discharge Standard
Silver	0.021	0.1
Boron	5.54	*
BOD	<7.5	30
Cadmium	0.583	0.15
Chlorine	<0.05	*
Copper	1.20	0.5
Iron	2.57	2.0
Hexane soluble Oil and Grease	11.5	15.0
Manganese	2.42	1.0
Nickel	0.14	1.0
Lead	1.59	0.2
Suspended Solids	67	15.0
Zinc	6.63	1.0

Those samples exceeding the General Use Standard as defined in 35 Ill. Adm. Code, Subtitle C, Part 304 are highlighted. \* No standard has been established in 35 Ill. Adm. Code, Subtitle C, Section 304.

Table 5  
Water Sample Result from Containment Area #2  
Collected on October 28, 1996  
Analyzed for NPDES Discharge Parameters  
Dissolved Metal Analysis

Parameter	Result in mg/l	General Use Standard
Cadmium, diss	0.22	0.15
Copper, diss	0.136	0.5
Iron, diss	<0.007	2.0
Lead, diss	0.010	0.2
Manganese, diss	2.14	1.0
Zinc, diss	0.68	1.0
Total Suspended Solids	23	15
pH	8.53	6-9

Bureau of Water has granted an NPDES permit, CA#2 may need to be enlarged to the east to increase capacity.

### **5.3 Removal Procedures Containment Area #4**

All visible zinc oxide was removed from Containment Area #4 and placed into Containment Area #1 at the time of construction of Containment Area #2. Debris in the form of tree stumps, shredded trees and rock is currently stored in Containment Area #4. Removal of each of these items is discussed below.

**Tree stumps** - A composite sample was collected from the soil held in the roots and sent to Prairie Analytical for analysis of TCLP lead, cadmium and zinc. The results indicated the zinc oxide held by the roots failed the TCLP test for all three parameters. Refer to Attachment 8 for a copy of the analytical results. The stumps will be handled in one of several manners. The stumps may be shaken and power washed to attempt to separate the zinc oxide from the roots. The soil removed will be collected and placed into Containment Area #1. After washing, the stumps will be fed through a grinder. A composite sample of the shredded materials will be collected for TCLP lead, zinc and cadmium. If the results indicate failure of the TCLP test, the material will either be disposed of as a hazardous waste at an approved facility, or assayed for recoverable metals content for acceptance at ELMET. If the material passes the TCLP test a special waste determination will be conducted to determine disposal options. Chemetco may alternatively shred the stumps as-is, and pre-qualify the materials for acceptance at ELMET or for off-site disposal.

Shredded trees - A composite sample of the shredded wood will be collected for analysis TCLP lead, zinc and cadmium. If the results indicate failure of the TCLP test, the material may be disposed of as a hazardous waste at an approved facility, or assayed for acceptance at ELMET. If the material passes the TCLP test a special waste determination will be conducted to determine disposal options.

Limestone Rock - the rock will be assayed for recoverable metals content for acceptance at ELMET. If ELMET denies acceptance of the rock, the materials will be placed on a shaker to remove as much excess soil as possible, followed by a power wash if necessary. Two composite samples will be collected from the rock for TCLP lead, zinc and cadmium. If the results indicate failure of the TCLP test, the material will be either be disposed of as a hazardous waste at an approved facility or washed further to remove the soil. If the material passes the TCLP test a special waste determination will be conducted to determine disposal options.

## **6.0 Proposed Sampling and Analysis to Demonstrate Clean Closure from Containment Areas 1, 2 and 4.**

Sampling and analysis of the Areas #1, 2, and 4 will be conducted as described in Sections 6.1, 6.2 and 6.3 below. Phase II of the Remediation Plan - Demonstration of Clean Closure will be submitted within 90 days after all sampling is completed.

### **6.1 Sampling and Analysis Containment Area #1**

Following removal of the zinc oxide material, the procedures outlined in CSD's Sampling and Analysis Plan dated October 10, 1996 will be followed except for the following:

Sampling will be conducted using a skid loader and five foot stainless steel split spoon samplers. Three split spoons will be used to speed sample collection. Each split spoon will be decontaminated between samples by washing withalconox , followed by steam cleaning, and finally a tap water rinse.

### **6.2 Sampling and Analysis Containment Area #2**

Chemetco is submitting to the IEPA, Bureau of Water, an operating and construction permit for a permanent storm water treatment unit to be constructed on the south side of Oldenburg Road. The treatment unit will be placed north of the spill area. The storm water treatment unit will be capable of treating all storm water that falls on

the plant. Chemetco currently uses water stored in the existing storm water impoundments for dust suppression of the yard. Chemetco proposes to leave Containment Area #2 in place to hold treated effluent from the wastewater treatment unit for storage of water for dust suppression.

To create Containment Area #2, all visible zinc oxide was pushed with the bulldozer to Containment Area #1. Containment Area #2 was constructed by pushing the native soils from the middle towards the sides to construct the berms. Containment Area #2 is approximately seven feet deep towards the middle. Chemetco proposes to sample the bottom and sidewalls of Containment Area #2 to demonstrate clean closure. This request is a slight modification from the Sampling and Analysis Plan submitted on October 10, 1996 due to Chemetco's desire to maintain use of the impoundment after zinc oxide removal activities are complete. Figure 6-1 contains a copy of the proposed sample locations and depths. Samples are proposed to be collected using stainless steel five foot split samplers to be advanced by either a skid loader or a drill rig. The samplers will be decontaminated between samples by washing withalconox , followed by steam cleaning, and finally a tap water rinse. Samples will be analyzed for the parameters identified in the Section 2.3 of the 10/10/96 Sampling and Analysis Plan. The remainder of the procedures as outlined in the Sampling and Analysis plan will be followed.

### **6.3 Sampling & Analysis of Containment Area 4**

Following removal of zinc oxide in Containment Area #1 and disposal of the vegetation and debris stored in Containment Area #4 , sampling of the remainder of

Containment Area #4 will be conducted. A partial sampling of this area was conducted on October 23, 1996. Sampling will be conducted using the same procedures described in Section 6.1 for Containment Area #1.

## **7.0 Groundwater Monitoring Plan**

The purpose of this proposed Phase I groundwater investigation, is to determine the absence/presence of hazardous constituents in the shallow perched aquifer related to the zinc oxide spill. Well installation will confirm or deny the existence of the shallow perched aquifer encountered during previous investigations at the facility north and east of the spill site as well as the subsurface characteristics.

### **7.1 Regional Geologic and Hydrogeologic Information**

The Chemetco site is located in the floodplain of the Mississippi River in an area locally referred to as the American Bottoms. This area is characterized by relatively flat topography. The gradient of the Mississippi River in the American Bottoms is about 6 inches per mile or  $9.5 \times 10^{-5}$ . The land surface gradient over a similar area is about 12 inches per mile or  $6.3 \times 10^{-5}$  both of these gradients are extremely flat.

Precipitation to the American Bottoms falls on the flat surface and either infiltrates into the ground or evaporates. Because of the flat surface there is very little runoff. Recharge to the groundwater system in this area is received from the highlands surrounding the American Bottoms, infiltration from channels, and Mississippi River flood waters. Infiltration of water into the ground is restricted by the clay and silt layer found near the surface. Beneath the clay and silt layer lies the regional American Bottoms sand and gravel aquifer which extends to bedrock. The source of some recharge may be the bedrock aquifer near pumping centers. Under non-pumping conditions the regional groundwater flow in the American Bottoms aquifer is expected to be toward the west or

southwest towards the Mississippi River.

The regional aquifer is generally greater than 90 feet thick and extends to the bedrock. Although there is not distinct boundary between the formations in the regional aquifer, the regional aquifer is considered here to be comprised of two distinct hydrogeologic units given the gradation from silty sand to coarse sand and gravel. The clean sand and gravel deposits in the bottom zone of the American Bottoms aquifer constitute the major water-producing zone in the area. These deposits are utilized as groundwater supplies for municipal and industrial withdrawals, including Chemetco. Figure 7-1.1 shows the groundwater divides created by the major pumping centers in the area of the Chemetco site (Kohlhase, 1987). In 1951 these pumping centers produced a maximum withdrawal of 110 million gallons per day (mgd). In 1985 the withdrawal rate had declined to about 60 mgd (Kohlhase, 1987).

The Illinois State Water Survey (Water Survey) conducts periodic water-level monitoring programs of selected wells in the American Bottoms aquifer. Utilizing this water-level data the Water Survey produces a potentiometric map of the aquifer. This potentiometric map shows that aquifer withdrawals have significantly changed the groundwater flow direction within the aquifer and the flow is directed towards the various pumping centers. Using the potentiometric map, the Water Survey has determined the approximate locations of groundwater divides between the pumping centers. These divides, whose exact locations change according to variations in recharge and withdrawal rates, delineate the approximate areas of influence of the pumping centers.

Figure 7-1.1. shows the groundwater divides determined by the Water Survey (Kohlhase,

1987). This figure shows that the Chemetco site is on the edge of the area of influence of the Poag pumping center. The Chemetco site is also located just south of the areas of influence of the Roxana and Wood River pumping centers. The regional mapping does not have sufficient delineation of the groundwater contours in the Chemetco site area to determine the regional direction of groundwater flow. The flow in this area, however, should be towards the Mississippi River.

Because of the prolific production of the American Bottoms aquifer, the limestone aquifer below the American Bottoms aquifer has not been tapped for groundwater supplies. It is believed, that the limestone aquifer could also be a source for high capacity production wells; water sampling in other areas has shown that this bedrock aquifer is highly mineralized.

#### **7.1.1. Description of Class I Groundwater**

The American Bottoms Aquifer as described in Section 7.1. and 7.2. is a Class I Groundwater pursuant to Ill. Admin. Code, Part 620.210.

#### **7.1.2. Identification of Private/Potable Water Supply Wells**

The Chemetco facility is located in a sparsely populated area. Consequently the number of withdrawal wells within a one (1) mile of the site is low. The only commercial/industrial are Chemetco's own wells. The well water is used for human consumption.

Well logs for ten (10) private wells within one (1) mile of the Chemetco facility were obtained from, State Agencies. Figure 7-1.2. indicates their locations in relation to the site. Several of the wells indicated in the figure are believed to be no longer in use. Through field investigations to be conducted concurrent with other field sampling activities, Chemetco will verify which wells remain in service in the area.

#### **7.1.4. Identification of Units Beneath the Site Subject to Class I Standards**

The American Bottoms Aquifer is subject to Class I standards as is any hydraulically connected unit. Therefore, the shallow perched aquifer, if encountered beneath the spill area, may also be subject to Class I groundwater quality standards.

#### **7.1.5. Identification of the Source of All Municipal Water**

The regional aquifer is reportedly a drinking water source downgradient of Chemetco; Hartford municipal wells are reportedly northwest of the facility. In addition, potable water for the Chemetco facility is drawn from the two facility water supply wells, screened in the lower regional aquifer.

### **7.2 Characterization of Geology**

As previously stated, the purpose of this proposed Phase I groundwater investigation, is to determine the absence/presence of hazardous constituents in the

shallow perched aquifer related to the zinc oxide spill. At this time it can only be assumed that the hydrogeologic/geologic conditions discussed below can be correlated from previously studied areas at this facility to the area beneath the zinc oxide spill. Well installation will confirm or deny the existence, as well as the characteristics, of a shallow perched aquifer.

Chemetco has conducted interim-status groundwater monitoring for units north of the zinc oxide spill area since January 1983. During related investigations, it has been determined that the general hydrogeology of the site consists of an aquitard that contains lenses of water-bearing sand and silt underlain by the regional American Bottoms sand and gravel aquifer. A cross-section is included as Figure 7-2.1. The aquitard contains a perched sand aquifer that outcrops to surface south of the facility as depicted in Figure 7-2.2.

The Chemetco facility is underlain by a clay and silty clay unit ranging from approximately 20 to 60 feet in thickness. Interbedded within the clay in the southeastern quadrant of the facility is a sand lense (also referred to as the perched sand aquifer). The perched sand aquifer extends from 5 to 20 feet below grade with a maximum thickness of 15 feet and is bounded above and below by the clay and silty clay. The hydraulic conductivity of the perched unit has been calculated from slug test data to be  $2.8 \times 10^{-3}$  cm/sec. The results of site investigations indicate that the water flows from north to south across the southeastern quadrant of the facility. Data indicate the water-bearing formation does not extend to the facility northern and western boundaries and stops within 300 feet of the southern and eastern boundaries. A second sand and silt lense has been identified, based on water level elevations, to the east of well 12.

The clay layer averages 10 feet in thickness beneath the shallow perched zone and increases to 25 feet in thickness in the northern portions of the Chemetco facility (where the perched sand aquifer is not present). The hydraulic conductivity of the clay layer based on slug test data indicate a hydraulic conductivity of  $4.6 \times 10^{-5}$  cm/sec which is two or more orders of magnitude lower than the aquifers and therefore constitutes an aquitard.

Beneath the clay is a layer of fine to silty sand that grades to coarse sand with depth and finally to sand and gravel. This unit is the regional American Bottoms Aquifer. The regional aquifer is generally greater than 90 feet thick and extends to the bedrock. Although there is not distinct boundary between the formations in the regional aquifer, the regional aquifer is considered here to be comprised of two distinct hydrogeologic units given the gradation from silty sand to coarse sand and gravel. The hydraulic conductivity of the upper regional zone determined by slug tests and pumping tests is  $1 \times 10^{-2}$  cm/sec. The hydraulic conductivity of the lower zone of the regional aquifer determined by pumping tests is  $1 \times 10^{-1}$  cm/sec. Regional groundwater flows under non pumping conditions towards the Mississippi River.

Chemetco will attempt to gather the following information during installation of the proposed well system specific to the area beneath the spill:

- A qualitative assessment of porosity, texture, uniformity, lithology of all significant units
- Significant structural features

- Stratigraphic contacts between significant formations/strata
- Zones of high permeability, fracture or channeling in consolidated and unconsolidated deposits
- Perched aquifers
- Location of borehole, depth of termination
- Zone of saturation/thickness of the unit
- Interpretations of hydraulic connections between saturated zones

### **7.3 Proposed Monitoring Well System**

A monitoring well system is proposed herein which is intended to yield representative groundwater samples from shallow groundwater beneath the Chemetco facility. Again, the purpose of this groundwater investigation is to determine whether shallow groundwater has been impacted by the zinc oxide spill undergoing clean-up.

#### **7.3.1. Well Location and Screens**

Based on data measurements collected during investigations conducted at Chemetco, flow in the shallow perched aquifer is thought to move predominately from north to south across the southeastern quadrant of the facility. Quarterly potentiometric maps

for 1996, Figures 7-3.1. through 7-3.4., are included for reference. Therefore, Chemetco is anticipating a similar flow regime in the vicinity of the zinc oxide spill area. Chemetco proposes to install one upgradient well north of Containment area #1 as depicted in Figure 7-3.5. Three downgradient wells are proposed along a primarily east-west traverse just south of Long Lake and the temporary diversion channel south of Containment Area #3 also as depicted in Figure 7-3.5. All wells will be screened at similar depths. Total depth of wells should not exceed 25 feet below ground surface (BGS). If no substantial sand lenses are encountered during drilling activities, the screens shall be set at the first water-bearing zone as encountered in the field. Hydraulic conductivity testing shall be performed in the field on all four wells.

#### **7.3.2. Drilling Operations**

Wells will be installed using a 4 1/4" hollow stem auger. There will be no addition of fluids or drilling muds. All drill cuttings will be containerized and disposed of properly.

#### **7.3.3. Construction, Development, and Maintenance of Wells**

All wells shall be constructed pursuant to Ill. Admin. Code, Part 920 of the Illinois Water Well Construction Code and the Well Construction Diagram included as Figure 7.3.6. All borings shall be continuously sampled using five foot split spoon samplers. A typical boring log and well completion report is included as Figures 7-3.7. and 7-3.8. Wells shall be constructed of the following materials:

- Well screens and risers shall be constructed of schedule 40 PVC, ASTM 2 pitch threads, 2 inch inside diameter;
- The screens shall be either 2 in/4 in Monoflex U-pack well screen, 0.010 inch slot size, ten feet in length and prepacked with 20/40 grade silica sand; or, a 2 in, 0.010 inch slot size, ten feet in length schedule 40 PVC well screen;
- If a pre-packed screen is not utilized, an artificial filter pack shall be placed in the annular space between the borehole wall and the screen. The filter pack material shall be chemically inert and installed in a manner that prevents bridging and particle-size segregation. At least two inches of filter pack material should be installed between the well screen and the borehole wall.
- Casing and screen material are to be decontaminated prior to installation to remove any coatings or manufacturing residues. Decontamination includes a wash with a mild non-phosphate detergent/potable water solution and a rinse with potable water;
- Silica sand (20/40 grade) will be used to extend the filter pack to a length no greater than two feet above the top of the screen;
- A minimum of two feet of bentonite, either granular, pellets, or chips shall be placed around the casing by means of prehydrating at the surface and pumping through a tremie pipe. The bentonite seal is to be allowed to completely hydrate, set or cure in conformance with the manufacturer's specification prior to installing the grout

seal in the annular seal;

- The annular space above the bentonite seal is to be filled with a neat cement containing bentonite from 2% to 6% by weight or a combination thereof;
- Wells will be constructed with a 4' by 4' concrete pad with (4) 6" steel bumper posts placed on the corners of the pad; and,
- Wells will be constructed with lockable steel well covers.

All wells shall be properly developed to ensure the collection of representative groundwater samples. All water removed from the wells shall be containerized until analyses are received from the lab, at which time it shall be disposed of appropriately.

The integrity and condition of each well shall be inspected quarterly during sampling activities. This shall be noted in the field notebook and sample collection record form. Any activities related to well maintenance shall also be recorded in the aforementioned records.

#### **7.3.4. Protection and Identification of Wells**

Wells will be protected from damage by constructing a 4' x 4' concrete pad with (4) 6" steel bumper posts on the corners of the pad. Lockable steel well covers, 4" x 5' in size, shall be also be utilized.

All wells shall be surveyed to determine their location as well as their distances from the spill area and their distance from each other. These locations shall be surveyed by a licensed professional surveyor ( or equivalent) within  $\pm 0.01$  foot in relation to mean sea level, which in turn is established by reference to an established National Geodetic Vertical Datum. The surveyed reference mark shall be clearly and permanently marked on top of the inner well casing.

The well identification numbers, monitor point number, shall be clearly and permanently marked on the outside of the protective cover.

#### **7.3.5. Well Replacement**

A monitoring well will be replaced if it is damaged, if it does not consistently produce a sample, or if there are problems attributable to well construction. If a well is replaced, all conditions specified in Attachment E to the DRAFT IEPA RCRA Closure Guidance Document dated November 1994 as well as Ill. Admin. Code Part 920 will be followed.

#### **7.3.6. Well Plugging and Abandonment Procedures**

At such time a well must be plugged or abandoned, the Agency shall be notified and such activities shall be executed in accordance with 77 Ill. Admin. Code 920.120 (b) (7) by grouting from the bottom up with a tremie pipe using neat cement containing bentonite from 2% to 6% by weight or combination thereof. This material shall be applied the full depth of the well and terminate within three feet of the ground surface. Final three feet shall be filled with premix concrete to the surface. Monitor Well Reports shall be submitted

to the Illinois Department of Public Health within 30 days after monitor wells have been completed on forms as are prescribed and furnished by the Department. Boring logs and monitor well completion reports shall be submitted as part of the report of findings for this Phase I investigation.

#### **7.4. Sampling and Analysis Plan**

Please refer to Attachment 9 which contains the Sampling and Analysis Plan.

#### **7.5. Parameters**

Since the groundwater monitoring proposed herein pertains to the zinc oxide spill, Chemetco is proposing to sample shallow groundwater for indicator parameters, the eight RCRA metals, and zinc as listed below:

- pH;
- Specific Conductance;
- TOX;
- TOC;
- Lead;
- Cadmium;
- Zinc;

- Arsenic;
- Barium;
- Silver;
- Mercury;
- Selenium; and,
- Chromium.

If any of the aforementioned constituents are present above the applicable III. Admin. Code Part 620 groundwater quality standards, confirmation sampling shall be initiated. If additional sampling confirms elevated concentrations, Chemetco will propose a Phase II investigation.

#### **7.6. Conclusion**

The purpose of the Phase I groundwater investigation contained in Section 7 is to determine the presence/absence of hazardous constituents in shallow groundwater related to the zinc oxide spill. Subsurface borings, a properly constructed monitoring well system and water quality analyses will allow such a determination.

A Phase I Report shall be prepared by Chemetco to be submitted to the Agency and at a minimum will include the following information:

- Boring logs;

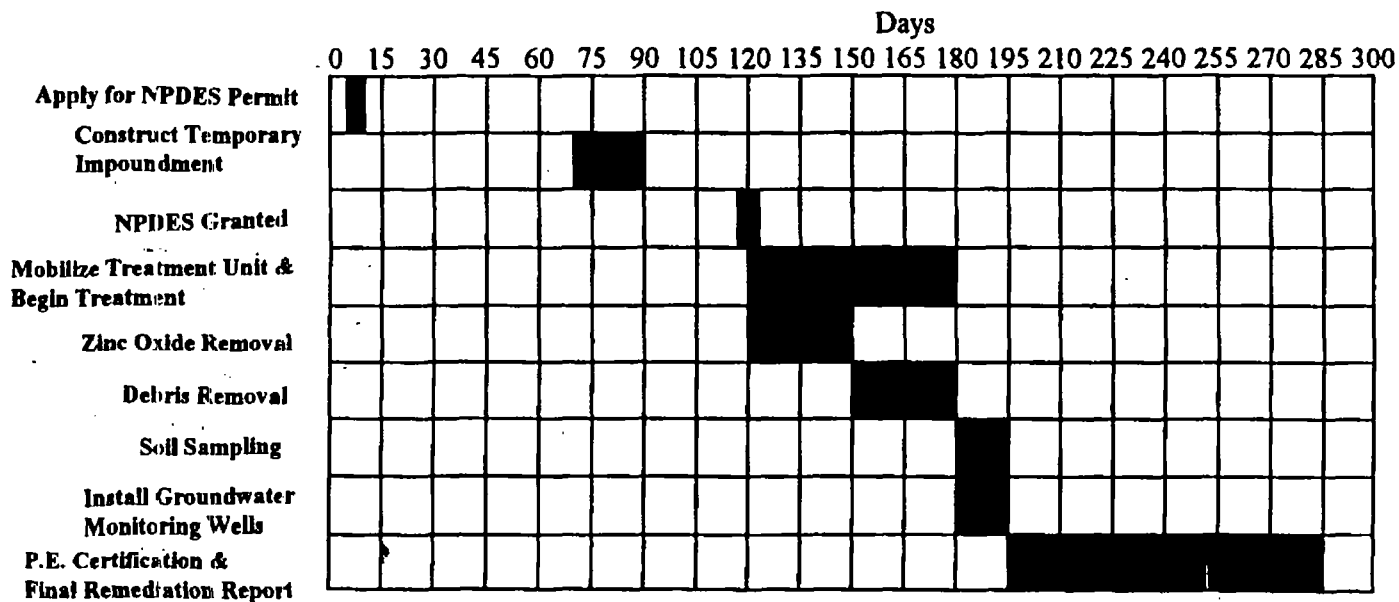
- Well completion reports;
- A description of the geology/hydrogeology in the vicinity of the zinc oxide spill;
- Two scaled geologic cross-sections with the interval over which the wells are screened clearly marked;
- An appropriately scaled map which shows the locations of borings, surface features, property boundaries, roads, spill area, etc.;
- Results of water quality analyses;
- Results of any hydraulic conductivity testing; and,
- Determination of groundwater class pursuant to 35 Ill. Admin. Code Part 620.

At such time as the results from the Phase I investigation indicate that further action related to groundwater is necessary, Chemetco shall propose additional investigation including a Phase II and/or Phase III investigation, as appropriate.

## **8.0 Remediation Schedule**

Chemetco proposes to close the spill area in accordance with the schedule outlined in Figure 8-1. Should events beyond the control of Chemetco occur, an amendment to the remediation schedule(s) will be submitted for Agency approval.

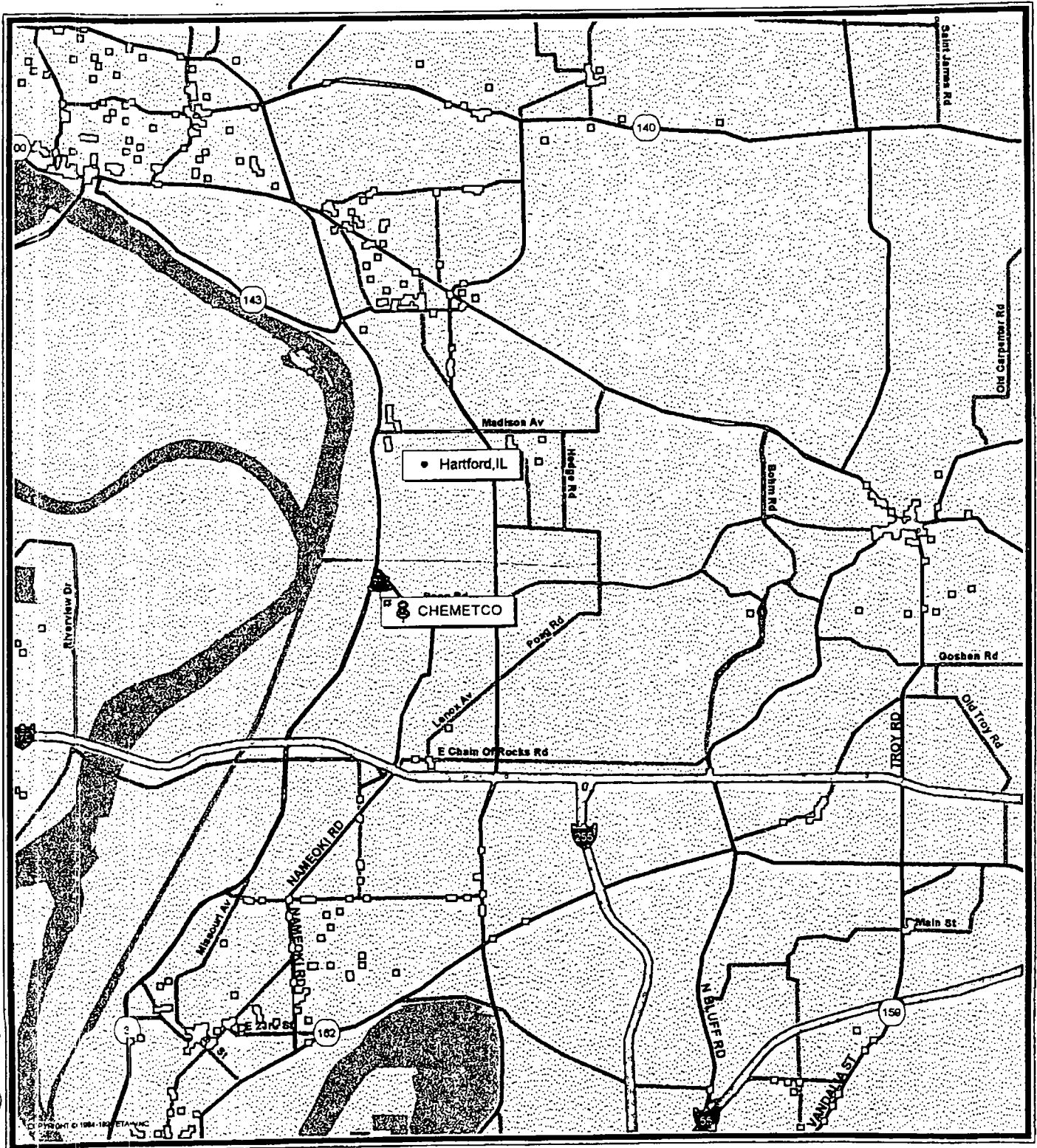
**TABLE 8.1  
REMEDIATION SCHEDULE  
CHEMETCO, INC.**

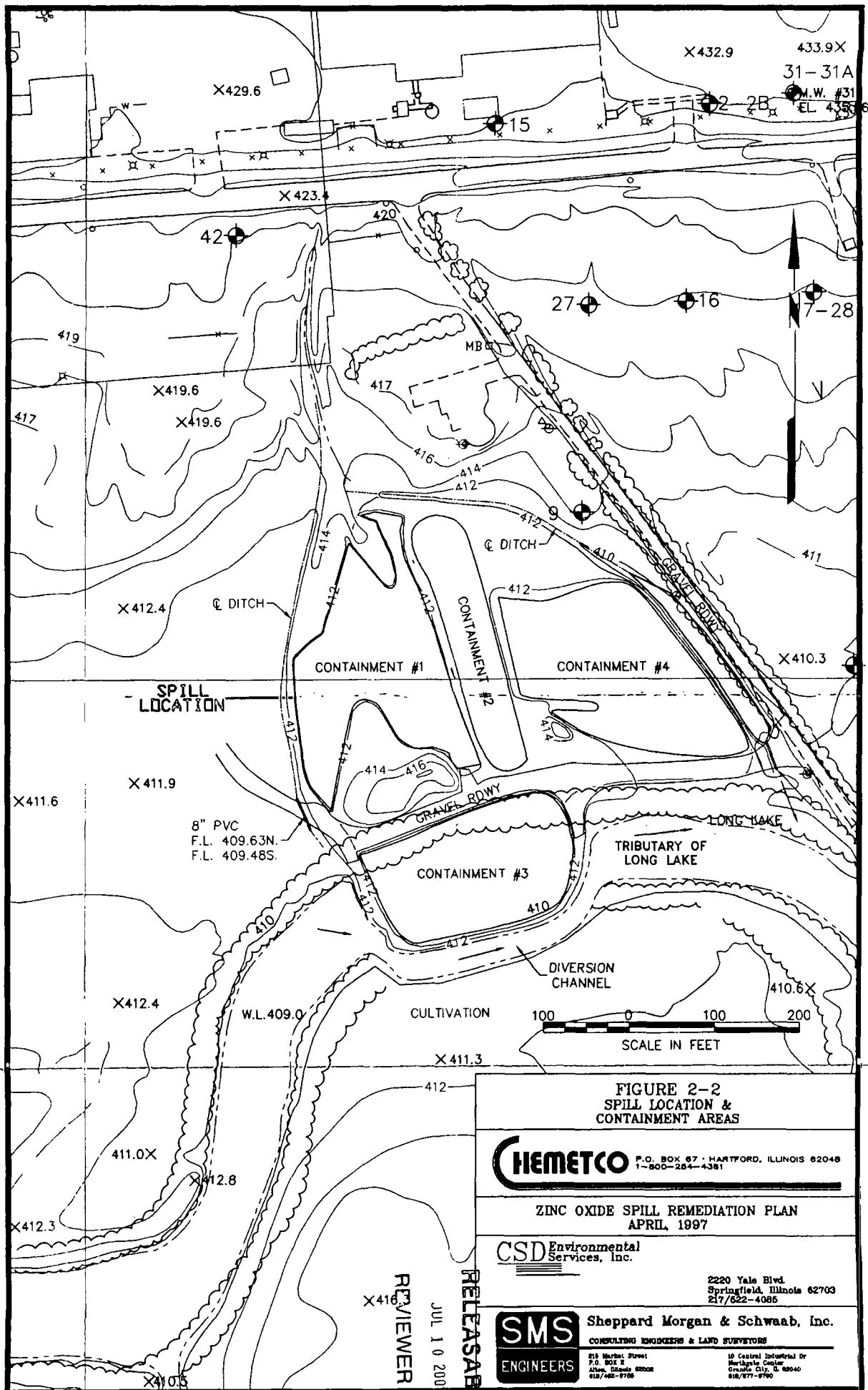


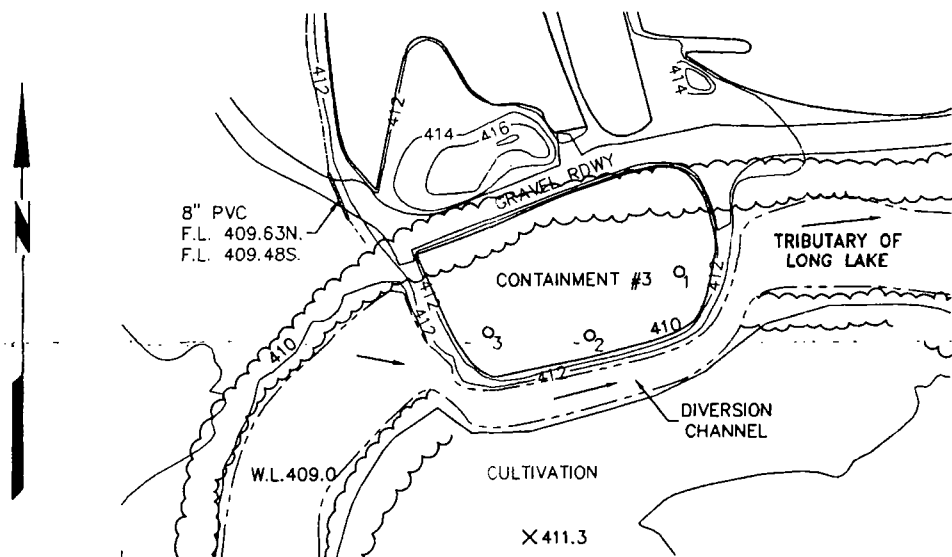
Chemetco, Inc.  
1198010003—Madison County  
Zinc Oxide Spill Remediation Plan  
April 1997

## FIGURES

FIGURE 2-1  
Location Map - Chemetco







100 0 100 200  
SCALE IN FEET

FIGURE 3-1  
INITIAL EXCAVATION  
SAMPLE LOCATIONS

**CHEMETCO** P.O. BOX 67 • HARTFORD, ILLINOIS 62048  
1-800-264-4381

ZINC OXIDE SPILL REMEDIATION PLAN  
APRIL, 1997

**CSD** Environmental  
Services, Inc.

2220 Yale Blvd.  
Springfield, Illinois 62703  
217/622-4086

**SMS**  
ENGINEERS

Sheppard Morgan & Schwaab, Inc.  
CONSULTING ENGINEERS & LAND SURVEYORS

215 Market Street  
P.O. BOX 8  
Springfield, Illinois 62702  
618/462-8708

10 Central Industrial Dr  
Springfield, Illinois 62704  
618/577-8708

RELEASEABLE  
JUL 10 2001  
REVIEWER MD

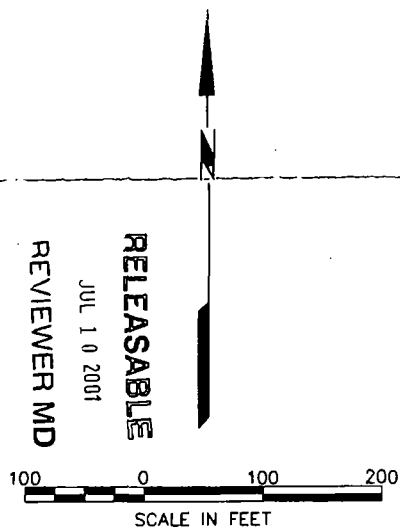
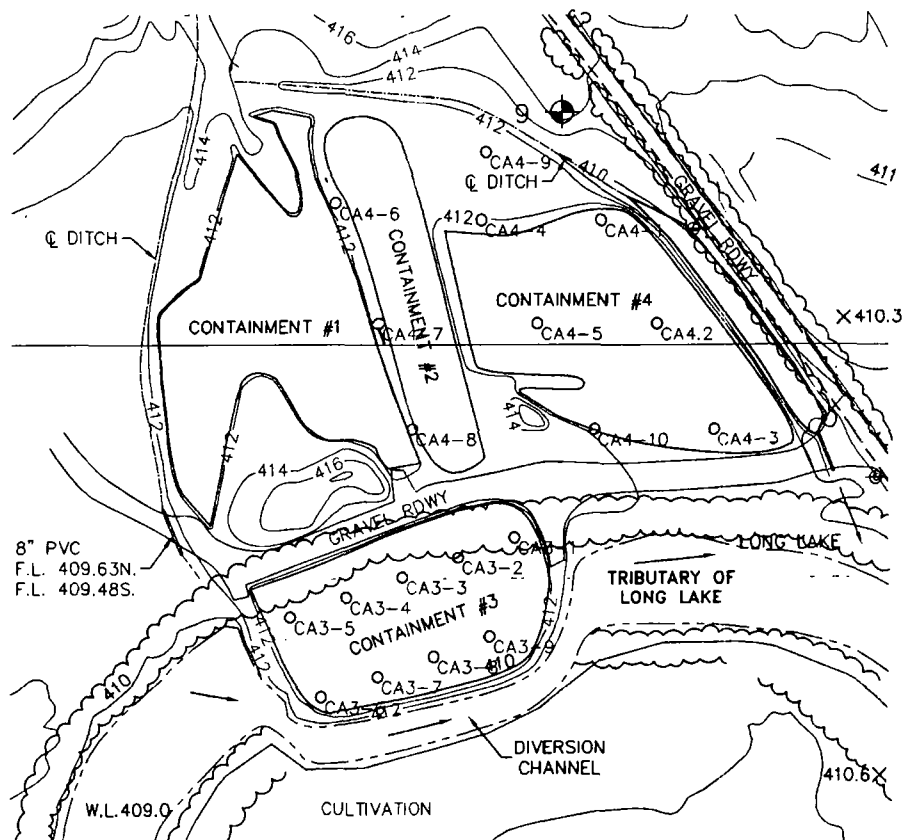


FIGURE 4-1  
SAMPLE LOCATIONS  
CONTAINMENT AREAS 3 & 4

**HIEMETCO** P.O. BOX 67 • HARTFORD, ILLINOIS 62048  
1-800-264-4381

ZINC OXIDE SPILL REMEDIATION PLAN  
APRIL, 1997

**CSD** Environmental  
Services, Inc.

2220 Yale Blvd.  
Springfield, Illinois 62703  
217/622-4065

**SMS**  
ENGINEERS

**Sheppard Morgan & Schwaab, Inc.**  
CONSULTING ENGINEERS & LAND SURVEYORS

210 Market Street  
P.O. BOX 5  
Alton, Illinois 62002  
618/462-9706

10 Central Industrial Dr.  
Northgate Center  
Grafton City, IL 62040  
618/877-9700

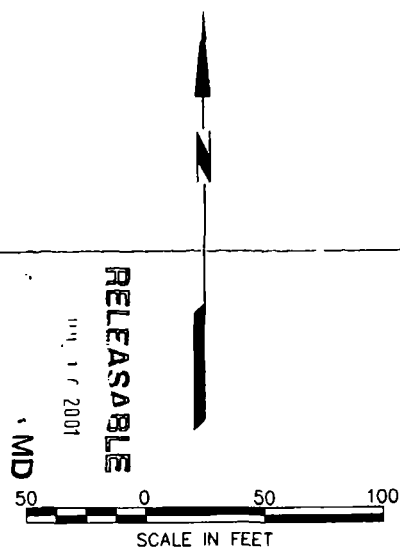
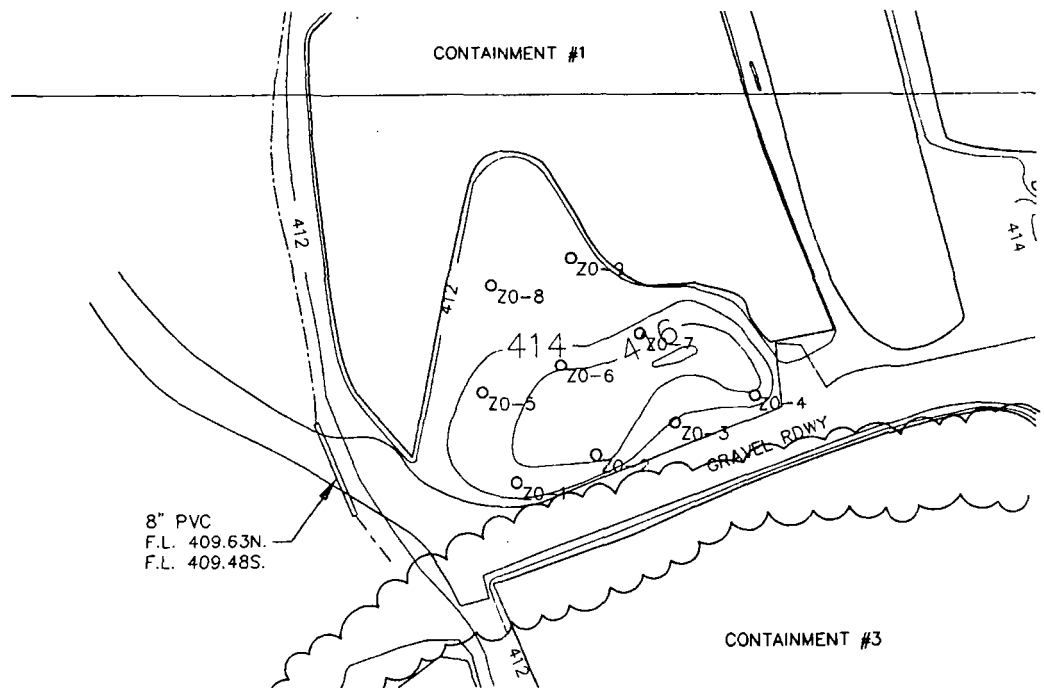


FIGURE 5-1  
ZINC OXIDE  
ASSAY LOCATIONS

**CHEMETCO** P.O. BOX 87 - HARTFORD, ILLINOIS 62048  
1-800-254-4381

ZINC OXIDE SPILL REMEDIATION PLAN  
APRIL, 1997

**CSD** Environmental  
Services, Inc.

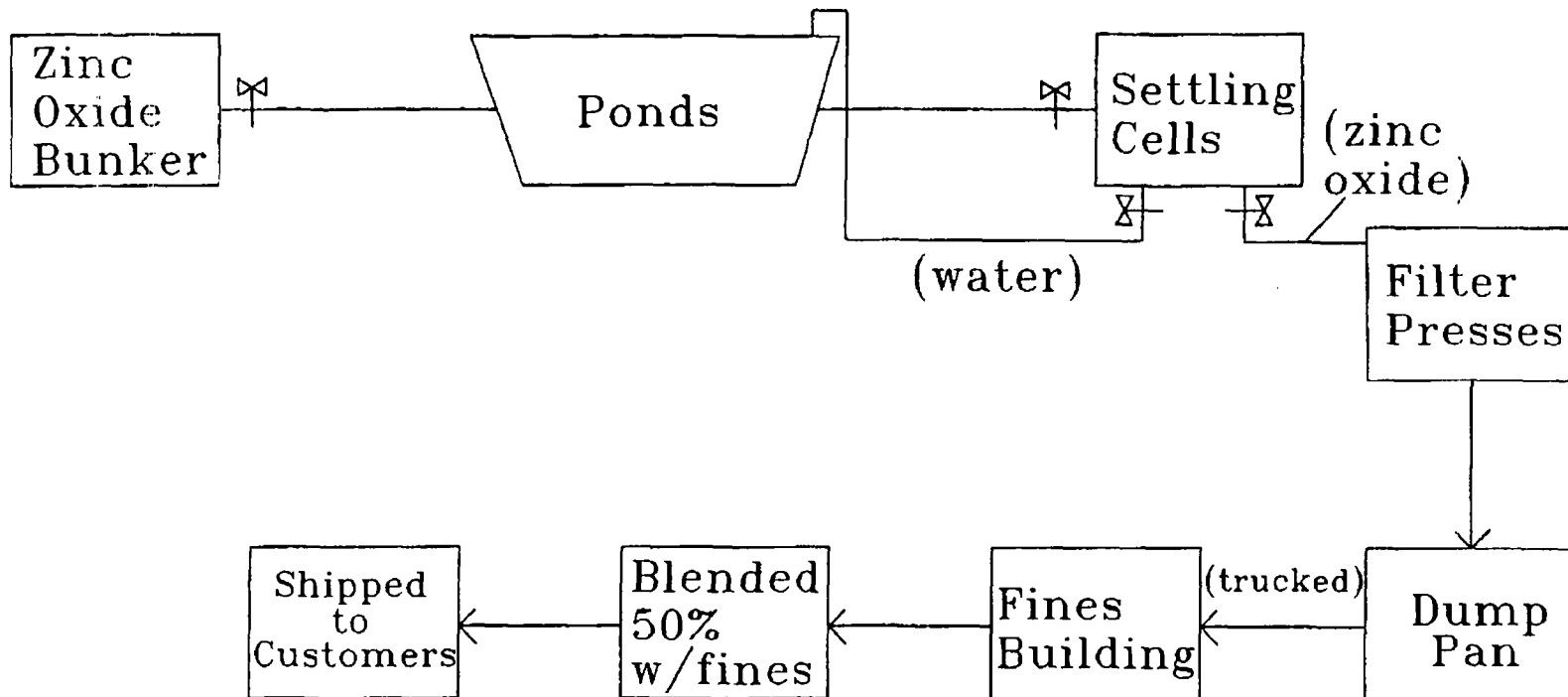
2220 Yale Blvd.  
Springfield, Illinois 62703  
217/622-4085

**SMS**  
ENGINEERS

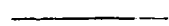
**Sheppard Morgan & Schwaab, Inc.**  
CONSULTING ENGINEERS & LAND SURVEYORS

818 Market Street  
P.O. BOX 8  
Alton, Illinois 62002  
618/465-9756

10 Central Industrial Dr.  
Mortgage Center  
Grafton City, IL 62040  
618/677-9700



Control Valve

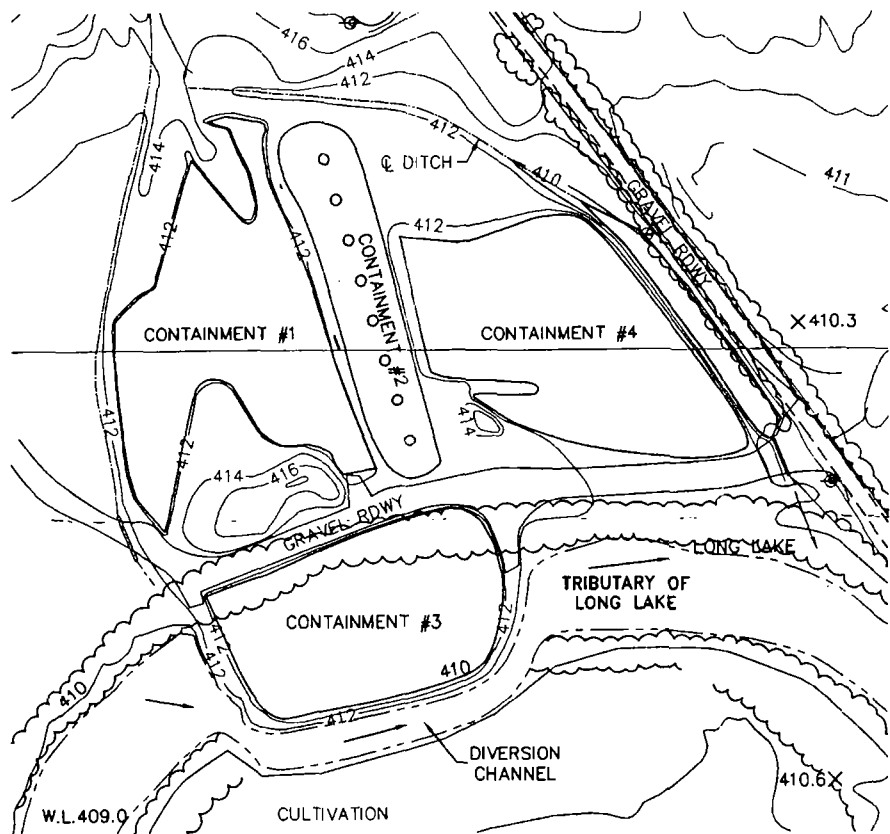


Pipe

FIGURE 5-2 Zinc Oxide Recycling Flow Diagram

Chemetco, Inc. 1/24/97

CSD Environmental Services, Inc.



100 0 100 200  
SCALE IN FEET

FIGURE 6-1  
REVISED SAMPLE LOCATIONS  
CONTAINMENT AREA #2

**CHEMETCO** P.O. BOX 67 • HARTFORD, ILLINOIS 62048  
1-800-284-4381

ZINC OXIDE SPILL REMEDIATION PLAN  
APRIL, 1997

**CSD** Environmental  
Services, Inc.

2220 Yale Blvd.  
Springfield, Illinois 62703  
217/522-4085

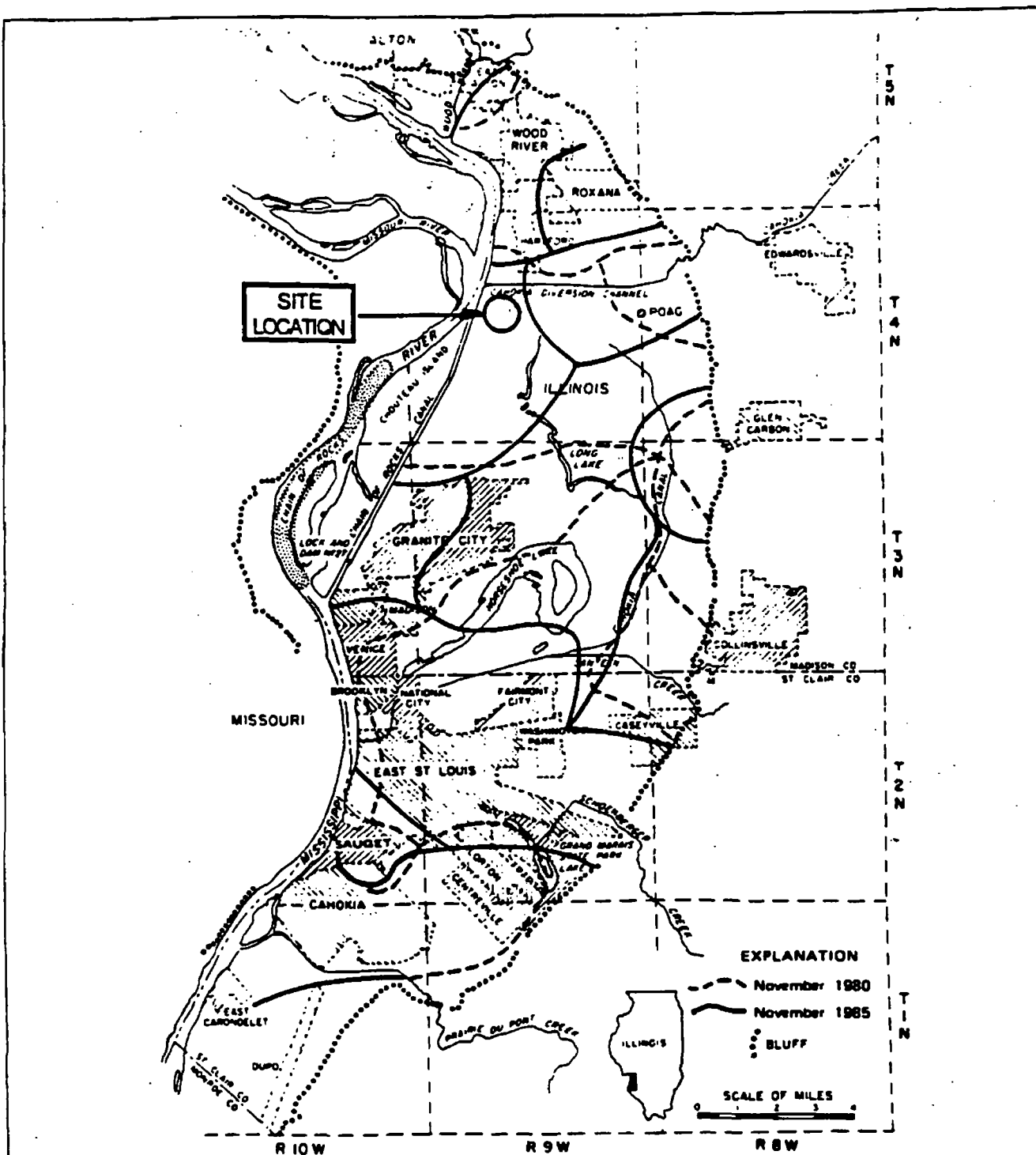
**SMS**  
ENGINEERS

**Sheppard Morgan & Schwaab, Inc.**  
CONSULTING ENGINEERS & LAND SURVEYORS

215 Market Street  
P.O. BOX 8  
Alton, Illinois 62002  
618/462-9786

19 Central Industrial Dr.  
Burlington Center  
Grainville City, IL 62040  
618/877-8700

RELEASEABLE  
JUL 10 2001  
REVIEWER MD



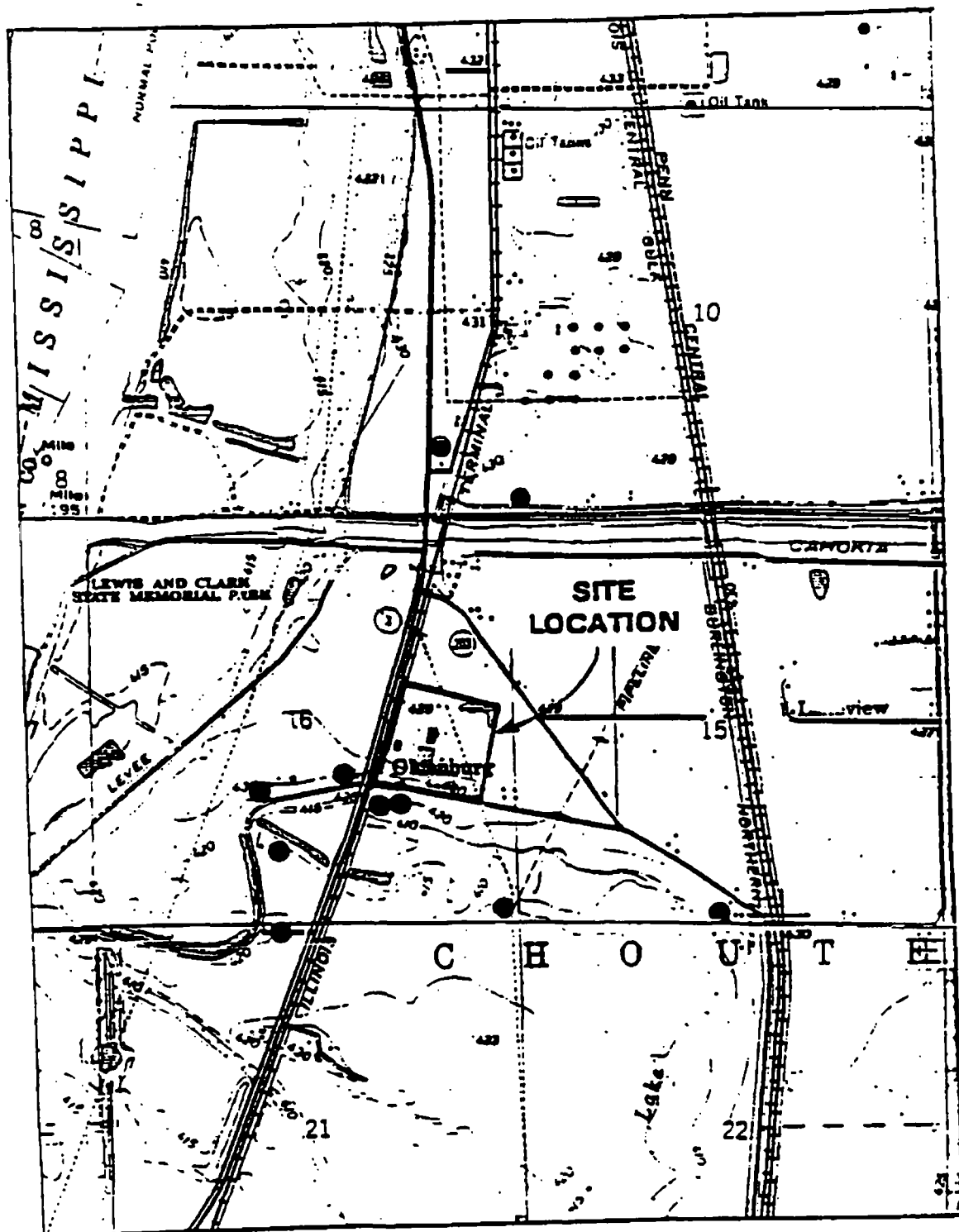
**ENSR**

**FIGURE 7-1.1**  
**GROUND-WATER DIVIDE LOCATIONS**  
**IN 1980 AND 1985**  
**(TAKEN FROM KOHLHASE, 1987)**  
**CHEMETCO, INC. HARTFORD, IL**

DRAWN BY:	DATE:	PROJECT NO.:
CHKD BY:	REVISED:	DWG. NO.:

SCALE OF MILES  
 0 1 2 3 4





LEGEND

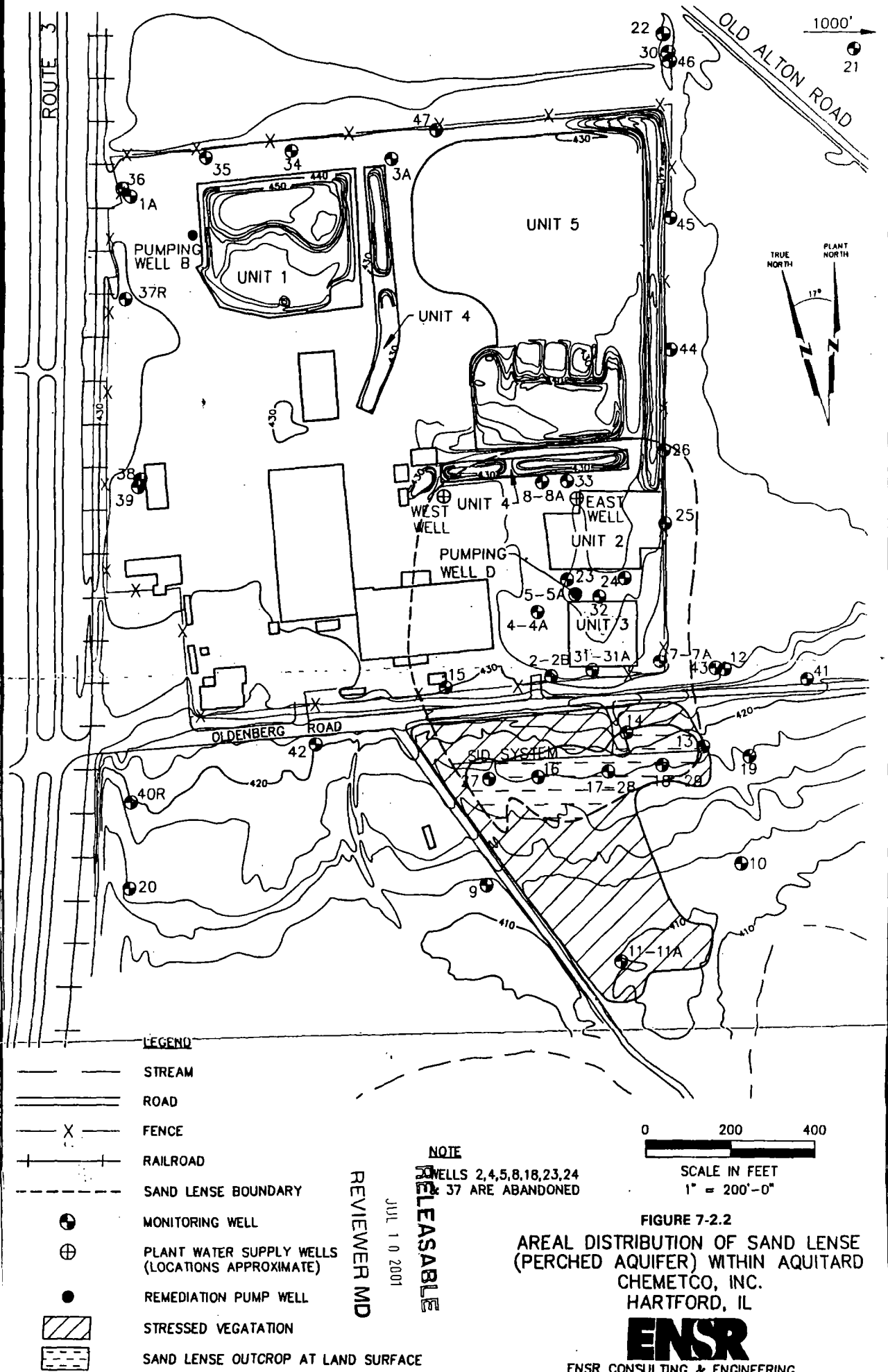
● PRIVATE WELL LOCATION

FIGURE 7-1.2  
PRIVATE WELL LOCATIONS WITHIN ONE MILE OF THE FACILITY

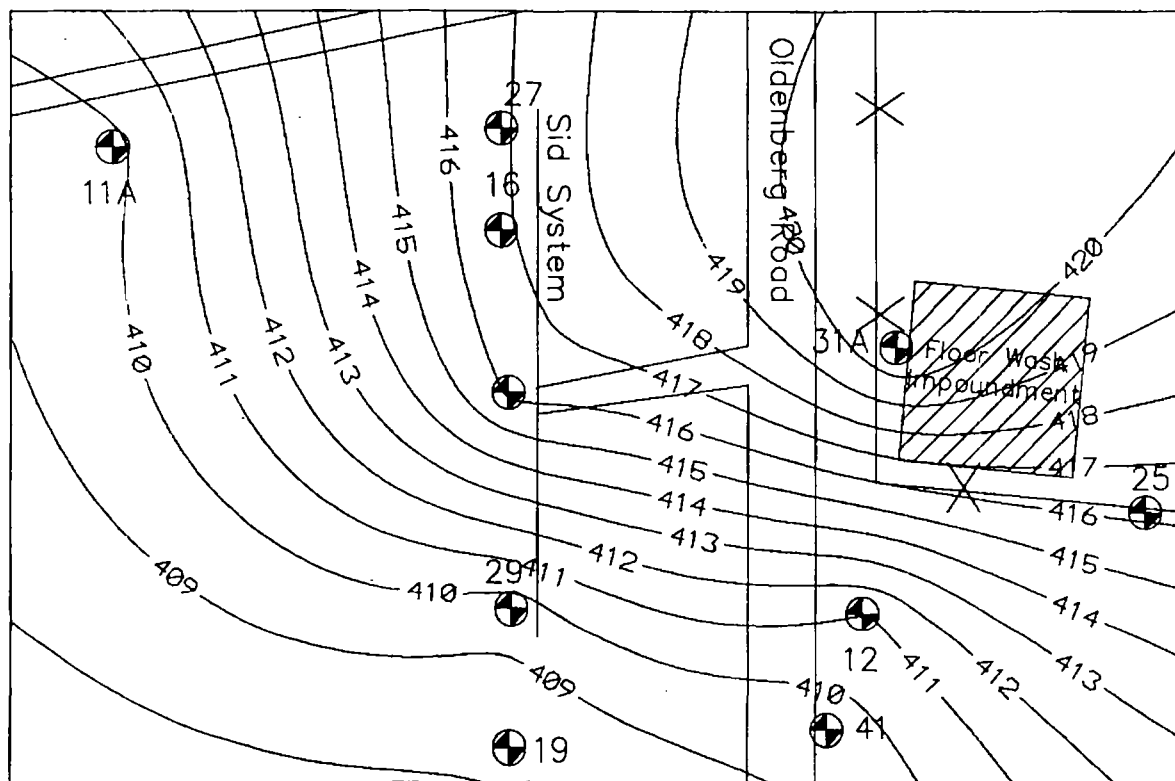
Unit Description	Approximate Vertical Extent (ft)
Top Soil, Slag Fill	0-11
Clay and Silt with Silty Sand Lense	12-56
Sand, some Gravel and Silt	12-75
Sand and Gravel	50
Limestone Bedrock	—

NOTE: VERTICAL EXTENT OF SLAG FILL  
DOES NOT INCLUDE SLAG STORAGE AREAS.

FIGURE 7-2.1  
GENERALIZED CONCEPTUAL GEOLOGIC COLUMN  
CHEMETCO, INC. HARTFORD, IL



NORTH  
SCALE: 1"=200'

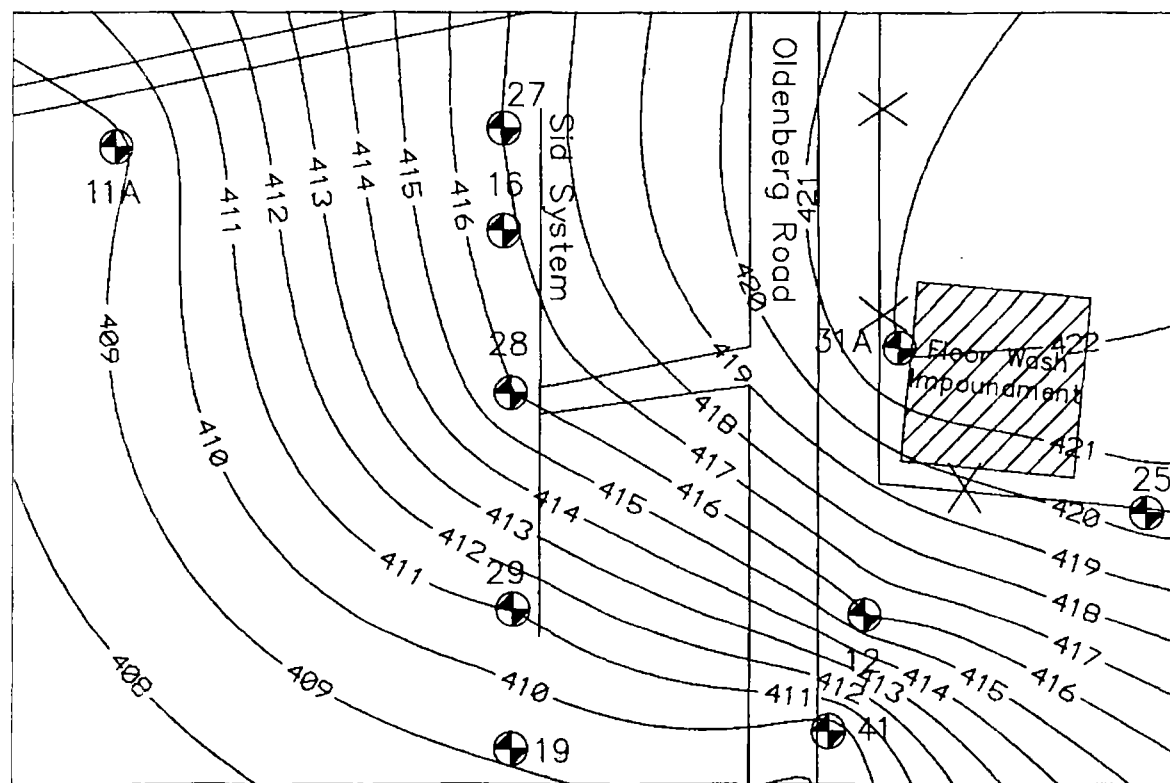


CHEMETCO INC.  
HARTFORD, IL.

FIGURE 7-3.1  
GROUNDWATER FLOW DIRECTION  
FOR THE SHALLOW AQUIFER  
JANUARY 1996

CSD ENVIRONMENTAL  
SERVICES

NORTH  
SCALE: 1"=200'

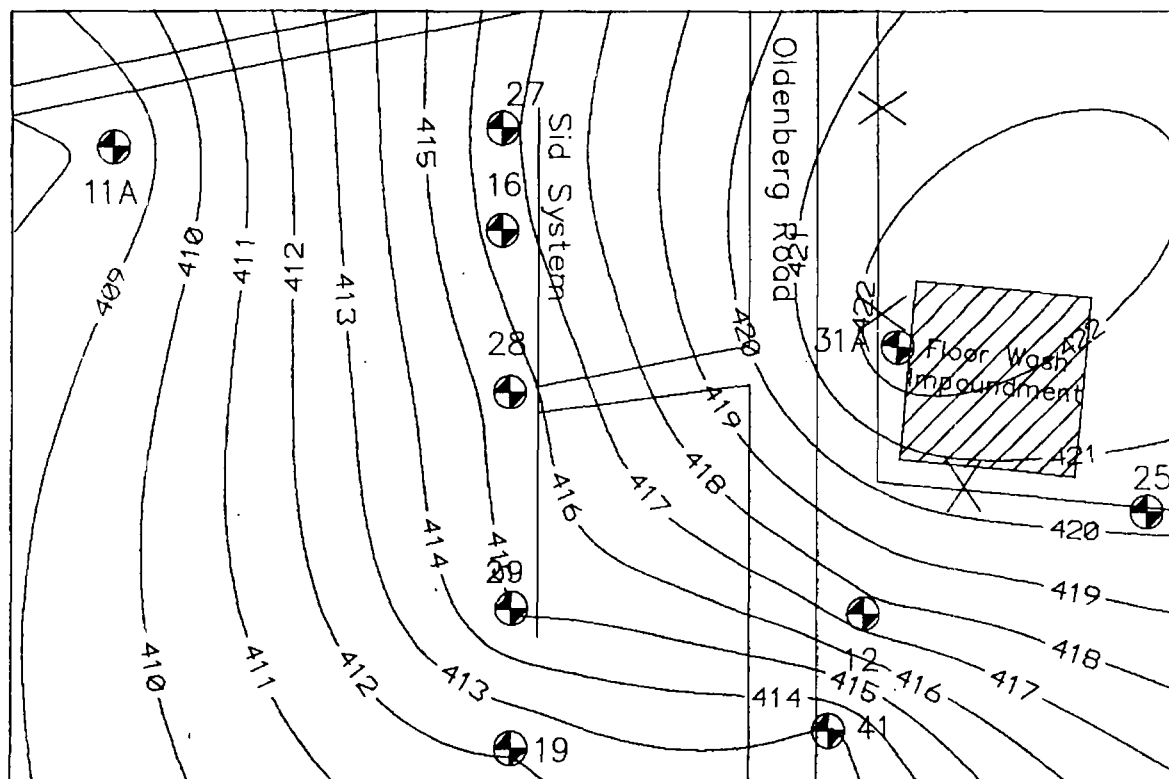


CHEMETCO INC.  
HARTFORD, IL.

FIGURE 7-3.2  
GROUNDWATER FLOW DIRECTION  
FOR THE SHALLOW AQUIFER  
APRIL 1996

CSD ENVIRONMENTAL  
SERVICES, INC.

NORTH  
SCALE: 1"=200'

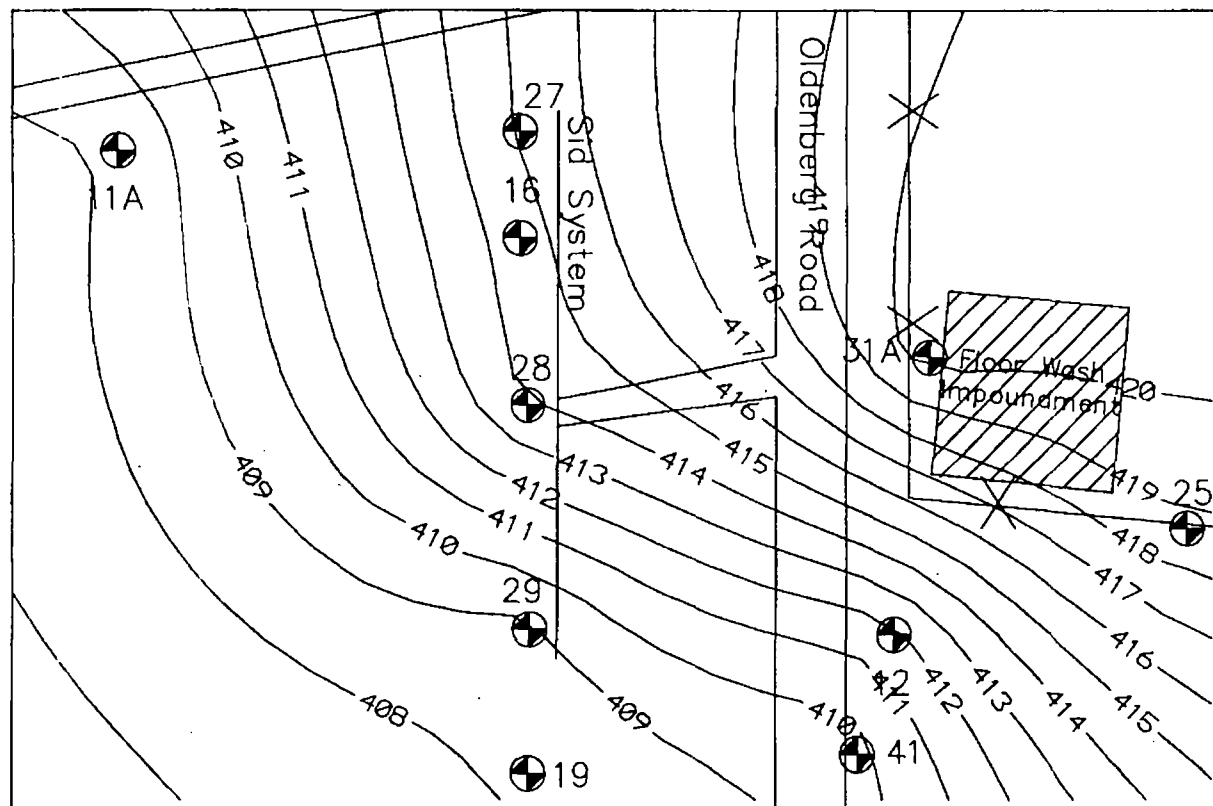


CHEMETCO INC.  
HARTFORD, IL.

FIGURE 7-3.3  
GROUNDWATER FLOW DIRECTION  
FOR THE SHALLOW AQUIFER  
JULY 1996

CSD ENVIRONMENTAL  
SERVICES

NORTH  
SCALE: 1"=200'



CHEMETCO INC.  
HARTFORD, IL.

FIGURE 7-3.4  
GROUNDWATER FLOW DIRECTION  
FOR THE SHALLOW AQUIFER  
OCTOBER 1996

CSD ENVIRONMENTAL  
SERVICES, INC.



CSD Environmental Services, Inc.  
Typical Well Construction Diagram

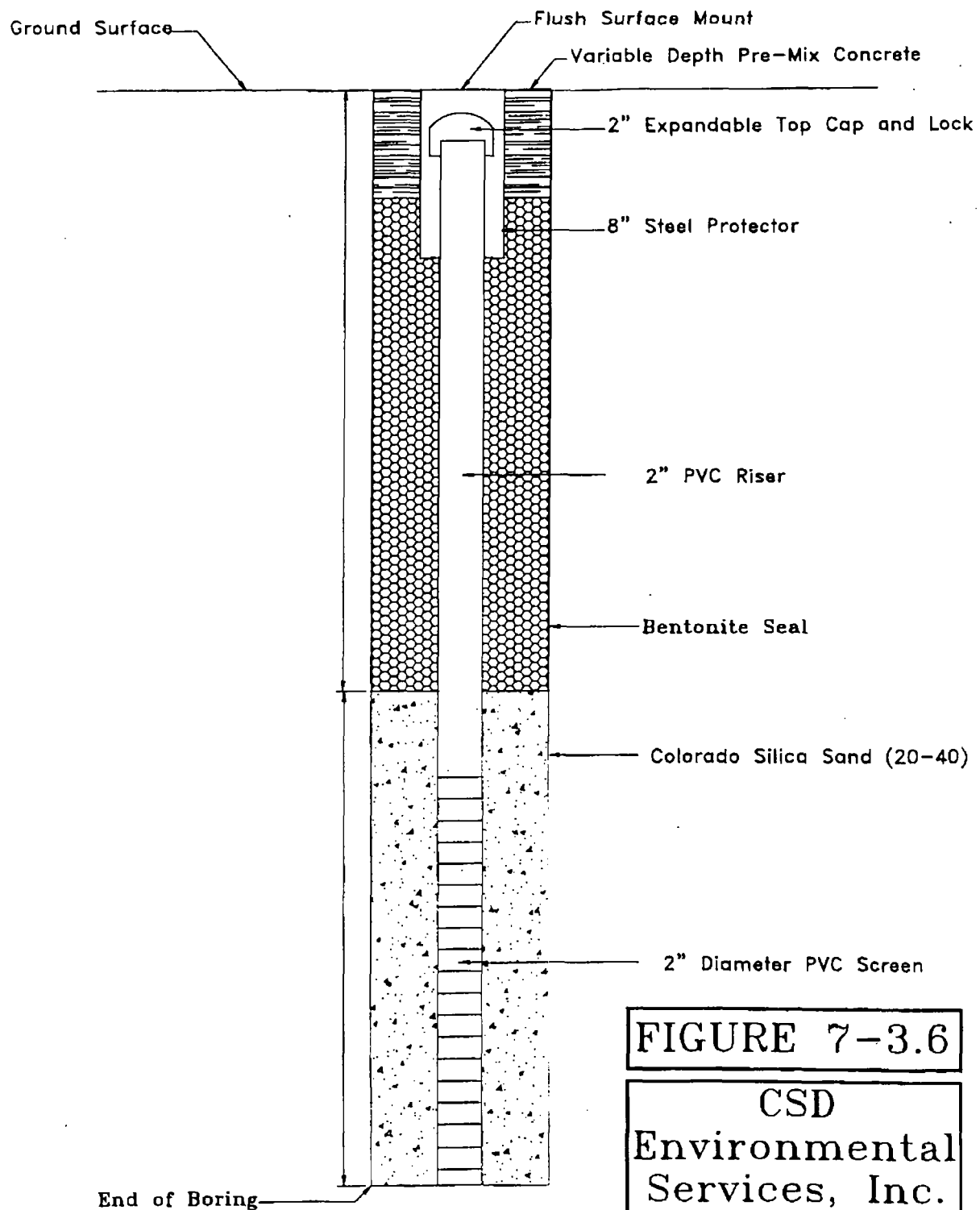


FIGURE 7-3.6

CSD  
Environmental  
Services, Inc.

FIGURE 7-3.7

LUST Incident No.:				Boring Number:		Page _____ of _____	
Site Name:				Boring Location:		Date: Start _____	
Address:						Finish _____	

Sample Number	Sample Recovery	OVA/PID/FID	Depth (feet)	Detailed Soil and Rock Description	ASTM Unified Soil Classification	Remarks

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data ▼ Depth While Drilling _____ ▽ Depth After Drilling _____	Auger Depth _____ Rig Type _____ Rotary Depth _____ Driller _____ Geologist _____	<h2 style="margin: 0;">CSD</h2> <p style="margin: 0;">Environmental Services, Inc.</p>
Note: Boring backfilled unless otherwise noted.		

FIGURE 7-3.8

# CSD Environmental Services

# LUST Well Completion Report

Incident No.: \_\_\_\_\_ Well No.: \_\_\_\_\_  
 Site Name: \_\_\_\_\_ Date Drilled Start: \_\_\_\_\_  
 Drilling Contractor: \_\_\_\_\_ Date Completed: \_\_\_\_\_  
 Driller: \_\_\_\_\_ Geologist: \_\_\_\_\_  
 Drilling Method: \_\_\_\_\_ Drilling Fluids (type): \_\_\_\_\_

## Annular Space Details

Type of Surface Seal: \_\_\_\_\_  
 Type of Annular Sealant: \_\_\_\_\_  
 Type of Bentonite Seal (Granular, Pellet): \_\_\_\_\_  
 Type of Sand Pack: \_\_\_\_\_

Elevations—.01 ft.

\_\_\_\_\_ Top of Protective Casing  
 \_\_\_\_\_ Top of Riser Pipe  
 \_\_\_\_\_ Ground Surface  
 \_\_\_\_\_ Top of Annular Sealant  
 \_\_\_\_\_ Casing Stickup

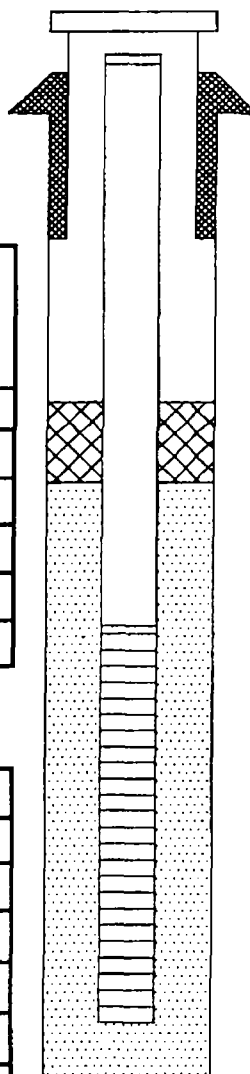
## Well Construction Materials

	Stainless Steel Specify Type	PVC Specify Type	Other Specify Type
Riser coupling joint			
Riser pipe above w.t.			
Riser pipe below w.t.			
Screen			
Coupling joint screen to riser			
Protective casing			

## Measurements

to .01 ft (where applicable)

Riser pipe length	
Screen length	
Screen slot size	
Protective casing length	
Depth to water	
Elevation of Water	
Free Product thickness	
Gallons removed (develop)	
Gallons removed (purge)	
Other	



\_\_\_\_\_ Top of Seal  
 \_\_\_\_\_ Total Seal Interval  
 \_\_\_\_\_ Top of Sand  
 \_\_\_\_\_ Top of Screen  
 \_\_\_\_\_ Total Screen Interval  
 \_\_\_\_\_ Bottom of Screen  
 \_\_\_\_\_ Bottom of Borehole

Completed by: \_\_\_\_\_

Chemetco, Inc.  
1198010003—Madison County  
Zinc Oxide Spill Remediation Plan  
April 1997

ATTACHMENT 1

Revised Work Plan - 10/10/96

**CHEMETCO, INC.**  
**WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL**  
**Revised October 10, 1996**

Prepared by:

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703



**FILE COPY**

**CHEMETCO, INC.**  
**WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL**  
**Revised October 10, 1996**

Prepared by:

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

**CSD**



**Environmental Services Inc.**

2220 Yale Boulevard  
Springfield, IL 62703  
(217) 522-4085

October 15, 1996

Illinois Environmental Protection Agency  
Field Operations  
Bureau of Land  
2009 Mall Street  
Collinsville, IL 62234

RE: 1198010003--Madison County  
Chemetco, Inc.  
ILD048843809  
FOS

Attention: Mr. Kenneth G. Mensing  
Regional Manager

Dear Mr. Mensing:

Enclosed please find three (3) copies of the *Revised Work Plan for the Immediate Response to the Zinc Oxide Spill* at Chemetco. The Revised Work Plan addresses the comments provided by the Illinois Environmental Protection Agency (IEPA) on September 30, 1996. The IEPA comments are listed below as well as Chemetco's response.

1. Chemetco must submit as-built scaled drawings of the impoundment area to the Agency.

*Figures 1 and 2 show to a scale of 1" = 150' the spill area and the containment areas.*

2. Chemetco must submit a new work plan containing a detailed description of the decontamination protocol at this site. The plan must include methods for disposal for decontamination of waste.

*A revised work plan is submitted under this cover addressing decontamination protocol and disposal methods.*

3. Inspections of the surface impoundment pursuant to 35 IL. Adm. Code 724.115 and 724.326 must be conducted on a daily basis. Chemetco must have contingencies in place to respond to detections of leaks in the impoundment.

*The spill area has been divided into four separate containment areas. Daily inspections for freeboard and erosion will be conducted. Inspection records will be maintained at the facility. In case of leakage from one of the containment areas, the smaller containment areas were constructed within the original larger containment area. In the event one berm of the smaller areas is breached, a larger area will contain the material until the berm can be repaired.*



4. To avoid making another regulated unit during clean-up, it is recommended that you obtain any necessary permits for waste disposal prior to initiating excavation activities. If it is necessary to store excavated soil and zinc oxide slurry waste on-site prior to disposal, do so only in containers or tanks for less than ninety days. Do not create regulated waste piles by storing hazardous waste in piles. The ninety (90) day accumulation time exemption (35 IAC 722.134) only applies to containers and tanks.

*No additional regulated units will be created during the removal and containment of the zinc oxide. It was necessary to separate the water from the zinc oxide, store the shredded vegetation, and stockpile contaminated limestone rock by creating smaller containment areas within the larger containment. However, no new units were created during this process since the entire larger containment area will undergo closure.*

5. Prevent further releases by capping the end of the 10 inch discharge pipe. Also locate the source of the discharge and insure that there are no further releases.

*The 10 inch pipe was sealed with a 10" PVC cap approximately 50' south of where it crosses Oldenberg Road. The valve on the south side of Oldenberg Road has been shut off. The pipe and valve will be removed up to the south side of Oldenberg Road and a permanent seal installed to prevent any further releases.*

6. The June 30, 1988 consent Order filed in the Circuit Court for the Third Judicial Circuit Madison County, Illinois states that zinc oxide that is placed on the land is not exempt from the requirements of the RCRA or State special waste requirements. Since the zinc oxide slurry discharge to the impoundment is characteristically hazardous for lead and cadmium, it must be managed as a hazardous waste. The waste removed from the impoundment must be sent to a facility with a USEPA Identification Number and must be permitted to accept the waste.

*Chemetco has characterized the spilled material and determined it is zinc oxide. Chemetco agrees if the material were to be left in the spill area, i.e. disposed, it would need to be managed as a hazardous waste. However, since the material can be recycled for further metal reclamation, as is the current zinc oxide produced, the material does not meet the definition of a solid waste under 35 Ill. Adm. Code, Part 721. Specifically, 721.102(e) states materials are not solid wastes when recycled if they can be returned to the original process from which they are generated, without first being reclaimed. The spilled zinc oxide can be sold to existing customers without further reclamation. The spilled zinc oxide has been secured and contained to prevent any further releases to the environment until this issue is resolved. Chemetco acknowledges the apparent disagreement regarding the management of the zinc oxide and is willing to work with the Agency towards resolution of this issue and has initiated discussions with the Illinois Attorney General's Office regarding the 1988 Consent Order.*

7. A detailed description of the dewatering process of the zinc oxide slurry in Chemetco's on-site filter presses must be submitted to the Agency before any dewatering takes place. This plan must include but not be limited to the following:

- a) Identify the cells which will be dedicated to the management of hazardous waste;

- b) Describe the flow of waste through the dewatering process;
- c) Provide a detailed description of how Chemetco will prevent the mixing of the current generation of zinc oxide with the zinc oxide removed from the impoundment. Chemetco must not mix the hazardous waste zinc oxide removed from the impoundment with the zinc oxide generated elsewhere in the plant;
- d) All accumulation of the zinc oxide slurry must be done in containers or tanks in compliance with 35 IAC 722.134 and 728.

*At the current time, Chemetco is not anticipating using the on-site filter presses to dewater the zinc oxide. Instead the zinc oxide, will be dewatered by adding a drying agent such as lime in the field prior to loading into trucks. If in the event, Chemetco decides to use the on-site filter presses, the information requested above by the Agency will be submitted prior to the use of the tanks and presses.*

- 8. The Illinois Environmental Protection Agency must be contacted at 618/346-5120 two (2) days prior to sending any waste to the on-site filter presses or associated tanks for dewatering.

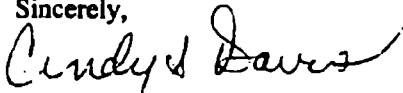
*The IEPA will be contacted two days prior to conducting any dewatering and/or shipment of the zinc oxide material.*

- 9. The Agency must inspect each cell prior to receiving any hazardous zinc oxide waste.

*See response to Item #7 above.*

I trust this information along with the Revised Work Plan addresses all of the Agency's comments raised in the September 30, 1996 letter. If you have any questions please feel free to contact me at the number below.

Sincerely,



Cindy S. Davis  
President

cc: Greg Cotter, Chemetco  
George von Stamwitz, Armstrong, Teasdale, Schlafly and Davis  
IEPA - Emergency Response Unit

**CHEMETCO, INC.**  
**WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL**  
**Revised October 10, 1996**

Prepared by:

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

## TABLE OF CONTENTS

1.0	INTRODUCTION .....	Page 1
2.0	PHASE I CONTAINMENT .....	Page 1
3.0	PHASE II - DEWATERING .....	Page 2
4.0	PHASE III - REMOVAL .....	Page 3
	A. Containment Area #1 .....	Page 3
	B. Containment Area #2 and 4 .....	Page 4
	C. Long Lake- Containment Area #3 .....	Page 4
	D. Vegetation Removal .....	Page 5
	E. Decontamination Procedures .....	Page 5
	F. Disposal Options .....	Page 5
	G. Closure .....	Page 5

## FIGURES

Figure 1 - Site Map

Figure 2 - Location of Containment Areas

## ATTACHMENTS

Attachment 1 - Environmental Analysis Sample Results

Attachment 2 - MSDS Sheet

Attachment 3 - Prairie Analytical Systems Sample Results

**CHEMETCO, INC.**  
**WORK PLAN FOR THE IMMEDIATE RESPONSE TO ZINC OXIDE SPILL**  
**SEPTEMBER 25, 1996**  
*Revised October 10, 1996*

**Prepared by: CSD ENVIRONMENTAL SERVICES, INC.**  
**2220 Yale Boulevard**  
**Springfield, IL 62703**  
**217/522-4085**  
**217/522-4087 (fax)**

## **INTRODUCTION**

An apparent spill of zinc oxide material was reported to the National Response Center and Illinois Emergency Management Agency on September 19, 1996. The spill was found during a routine RCRA Inspection conducted by the IEPA on September 18, 1996. Personnel from the United States Environmental Protection Agency (USEPA) were also present during the inspection. During the inspection, material that appeared to be zinc oxide was discharging from a pipe located south of Old Oldenberg Road. The IEPA and Chemetco, Inc. (Chemetco) collected samples of the water and of the sediment. Three sediment samples and one water sample were collected. Chemetco's samples were shipped to Environmental Analysis on the afternoon of September 18, 1996. Analysis was requested for total lead, cadmium, and zinc and TCLP on lead, cadmium and zinc. Sample results were received by Chemetco on September 27, 1996. Copies of the analytical results are provided as Attachment 1 to this work plan.

To ensure further releases from the pipe do not occur, a PVC plastic cap was temporarily placed over the end of the discharge pipe. The valve on the south side of Oldenberg Road has been shut off. The pipe and valve will be removed up to the south side of Oldenberg Road and a permanent seal installed to prevent any further releases.

This work plan addresses the temporary containment and removal of the apparent zinc oxide material. CSD Environmental Services, Inc. (CSD) has confirmed the release is confined to Chemetco's property. The work plan will be carried out in three phases. The first phase will focus on containment, the second phase will focus on dewatering of the area, and the final phase will be removal of the zinc oxide. A separate plan will be submitted proposing sampling locations, parameters, etc., for the closure of the incident.

## **PHASE I - CONTAINMENT**

Initially a diversion channel was constructed to reroute the lake past the spill area. A Section 404 Permit, of the Clean Water Act (CWA), was required by the Army Corp of Engineers (Corps) to reroute the lake. A permit application was faxed to the Corps on Friday, September 20, 1996 with a request to begin construction on Saturday, September 21. The application consisted of a drawing Figure 1 showing the impacted area, the location of all proposed dams, and the diversion channel.

The following steps were conducted to achieve containment:

1. A road was constructed from the west side of the private lane to the west dam (see Figure 1 attached). This road was constructed using limestone rock. The road started at a height of about 2 feet at the private lane and gradually increased to about 5 feet at the west dam. The total length of this road was about 300 feet. Later the road was extended to intercept the south portion of the truck parking lot. This allows heavy equipment and trucks to enter the spill area without backing up. This will expedite the dewatering and removal of the zinc oxide material. This road is called the rock road/dam.
2. The north side of the rock road/dam was lined with 8 to 10 millimeter thickness polyethylene plastic to inhibit water from flowing under and reaching Long Lake. Limestone rock, was placed on top of the liner to hold it in place.
3. An earthen berm was constructed approximately 3 to 5 feet in height around the entire perimeter of the spill area. A drainage ditch was constructed to divert surface water to Long Lake around the impacted area.
4. A diversion channel 25 feet wide by 3 to 5 feet in depth was constructed to reroute water in Long Lake around the spill area.
5. Two dams were constructed on Long Lake to help in the diversion. The east dam is approximately 10 to 12 feet wide. The west dam is approximately 15 feet wide. Clean soil from the construction of the diversion channel was used to construct the dams.

## PHASE II-DEWATERING

To separate the water and zinc oxide and allow heavy equipment access, two new berms within the containment area were necessary. Two containment areas were made, Containment Area #1 for storage of zinc oxide and Containment Area #2 for water. Refer to Figure 2 for the location of the containment areas. The containment areas will be inspected daily to monitor freeboard levels and erosion. Inspection records will be maintained at the facility. The smaller containment areas are constructed within the larger containment. In the event one berm of the smaller areas is breached, a larger area will contain the material.

Zinc oxide was pushed by a bulldozer into Containment Area #1 to allow construction of Area #2. Water was removed from Long Lake and the southwest corner of Containment Area #1 by excavating holes and placing a slotted 55 gallon drums in each. The purpose of the drums was to prevent solids from reaching the portable pumps used to transfer the water into Containment Area #2.

### PHASE III-REMOVAL

Zinc oxide will be removed from Containment Area #3 - Long Lake first, followed by either Containment Area #1 or 2. Containment Area #4 does not contain any visible zinc oxide. Refer to Figure 2 for the location of the containment areas.

#### A. CONTAINMENT AREA #1

Zinc oxide will be removed by either pumping it to the southwest corner of Containment Area #1 or mixing it with a drying agent to enable excavation. A decision on the type of removal will be made based upon the moisture content of the zinc oxide material and economic and environmental considerations. The two processes are described below.

1. Slurry Method - The zinc oxide will be collected in a sump. The sump will have a screen placed over it to screen out foreign objects such as trees, roots, etc. The slurry will be handled in one of the following manners:
  - a. The slurry will be placed in a tanker truck and transported to Chemetco's plant. The slurry will be directly unloaded into a tank to separate the water and zinc oxide. The slurry will be routed to a filter press for further dewatering. The decanted water will be routed to the polish pits and used for cooling tower make up water. The filter cake will be sold for further reclamation.
  - b. The slurry will be pumped into a temporary tank and filter press set up at the containment area. Filter cake will be loaded into a roll off box and water will be routed back to Containment Area #2 for further handling as identified in Item a above. The filter cake will be sold for further reclamation
2. Use of a drying agent - "Code L Lime", a special type of lime used by the Illinois Department of Transportation for dewatering purposes, will be mixed with the zinc oxide to remove moisture. Once the material passes the paint filter test it will be transported for further reclamation. An MSDS sheet for "Code L Lime" is provided as Attachment 2. A test was conducted on Friday, October 4, 1996 to determine if "Code L Lime" is an effective drying agent. Two yards of "Code L Lime" was mixed with approximately 10 yards of zinc oxide in Containment Area #2. The "Code L Lime" was proved effective in reducing the moisture in the zinc oxide.

A field pilot test was also conducted to determine the best drying agent for reducing the leachability of lead and cadmium in zinc oxide. Further treatment of the soil,

after the zinc oxide is removed, may be necessary to meet clean up objectives. The test was conducted using both lime and triple super phosphate (common fertilizer).

Before beginning the test a sample (E-1), was collected of the pure zinc oxide. The first test was conducted using only lime as a drying agent. Lime and zinc oxide were mixed using a ratio of 25% lime and 75% zinc oxide. Sample (E-2) was then collected from this mixture for analyses. The second test consisted of mixing super triple phosphate with the zinc oxide and lime mixture at a ratio of 75% lime and zinc oxide to 25% triple super phosphate. A sample of the mixture (E-3) was then collected. All samples were analyzed for TCLP lead, cadmium and zinc. The samples were hand delivered to Prairie Analytical Systems in Springfield for rush analysis. Sample results showed triple super phosphate was very effective in binding the lead, cadmium and zinc. Treatment of the soil with triple super phosphate to bind the remaining metals may be an option. Sample results are provided in Attachment 3.

After all the visual zinc oxide is removed, sampling will be conducted for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

#### **B. CONTAINMENT AREAS 2 AND 4**

Water in Containment Area #2 will be sampled to determine if it meets the existing NPDES discharge requirements. If the water meets the requirements, it will be pumped to the permitted outfall area for discharge. If the water does not meet the requirements, it will be transported to the plant for use as cooling tower make up water. After the water is removed from Containment Area #2, any visible zinc oxide will be removed and placed into Containment Area #1. Sampling will be conducted in Containment Areas 2 & 4 for closure in accordance with the sampling and analysis plan discussed in Phase III - Section G.

#### **C. LONG LAKE - CONTAINMENT AREA #3**

Before removing of the zinc oxide from Long Lake, two rock pads will be placed south of the rock road/dam to allow a trackhoe access across Long Lake. The trackhoe will remove all impacted vegetation and place it on the rock road/dam where another trackhoe will transport it to the shredder. The shredder will be located within the containment area. After the vegetation is removed and the lake is dewatered, the trackhoe will scrape the zinc oxide from Long Lake toward the rock road/dam. The trackhoe will place the zinc oxide into Containment Area #2. After all the visual zinc oxide is removed, sampling will be conducted for closure. If the sample results indicate the remaining soils are below the applicable objectives, the two rock pads will be removed. The rock forming the rock pads will be inspected and any affected rock will be washed at the decontamination pad to allow further use. The soil beneath the pads will be removed and placed into containment area #2. After all the visual zinc oxide is removed, sampling will be conducted for closure in accordance with the

sampling and analysis plan discussed in Phase III - Section G.

#### **D. VEGETATION REMOVAL**

A large portion of the spill area contained dense vegetation such as trees, shrubs, and plants. The vegetation was removed and fed into a grinder. The shredded material will be stored within the containment area. We anticipate using the material to help dry the zinc oxide. If this is not possible, the material will be mixed with the soil and disposed.

#### **E. DECONTAMINATION PROCEDURES**

All equipment will be decontaminated by high pressure steam cleaning following gross removal by scraping. All decontamination will be conducted on a decontamination pad constructed at the east edge of the rock dam/road. Refer to the Figure 2 for the location of the decontamination pad. All personnel entering the contaminated area must go through decontamination before entering a clean area in accordance with the Site Health & Safety Plan. All decontamination rinse waters and solids will be collected in a sump and transported to the containment area to be handled as the waste present in those areas.

#### **F. DISPOSAL OPTIONS**

The zinc oxide recovered from Long Lake and Containment Area #2 will be handled in the same manner as Chemetco's existing zinc oxide filter cake. The zinc oxide will be sold to existing customers for further metal reclamation.

#### **G. CLOSURE**

A sampling and analysis plan will be submitted to the IEPA for review. After concurrence from the IEPA of the plan is received sampling and analyses will be conducted and the results submitted to the IEPA. At the completion of the remediation, a closure plan will be submitted to the IEPA, Bureau of Land.

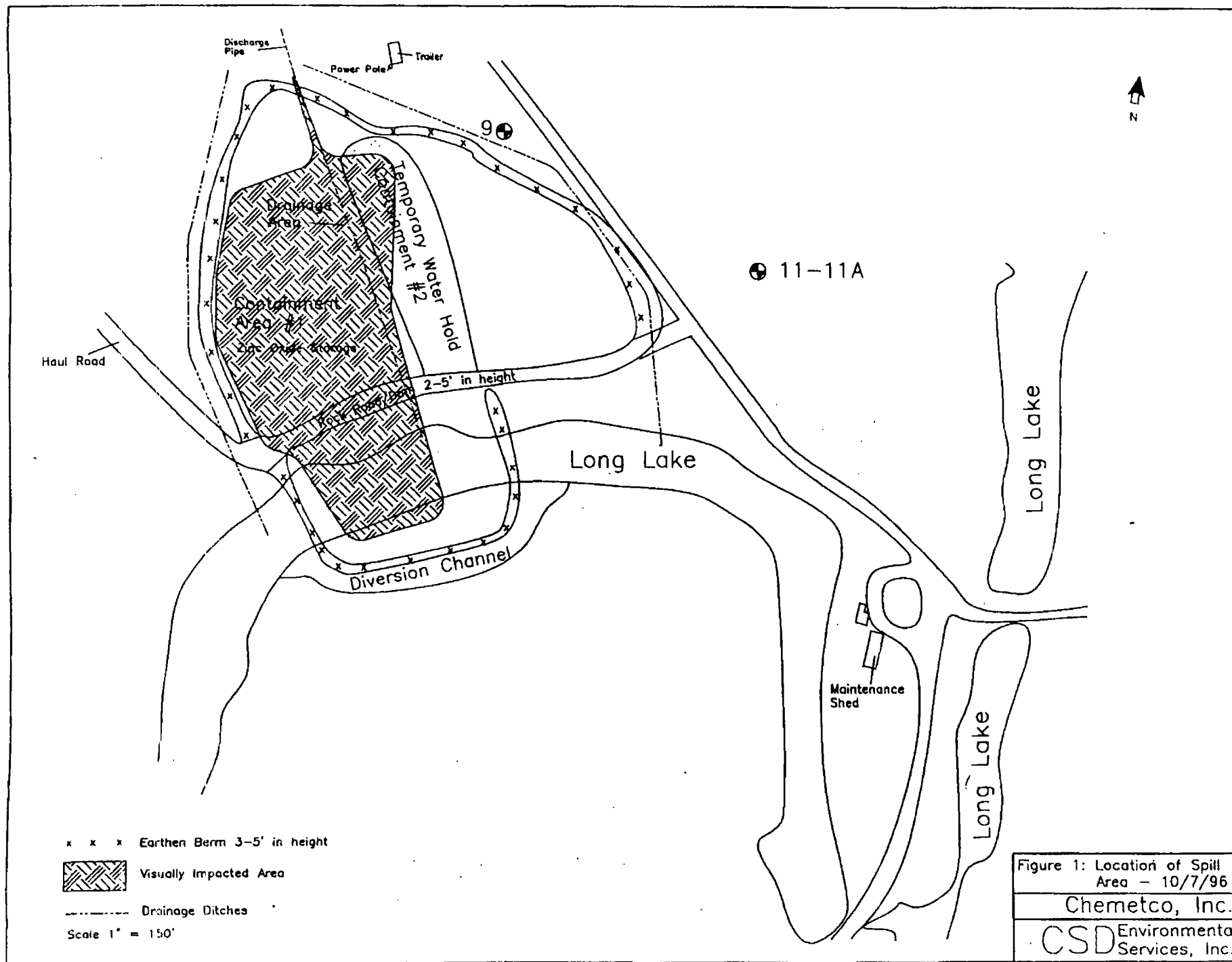


Figure 1: Location of Spill Area - 10/7/96

Chemetco, Inc.

CSD Environmental Services, Inc.

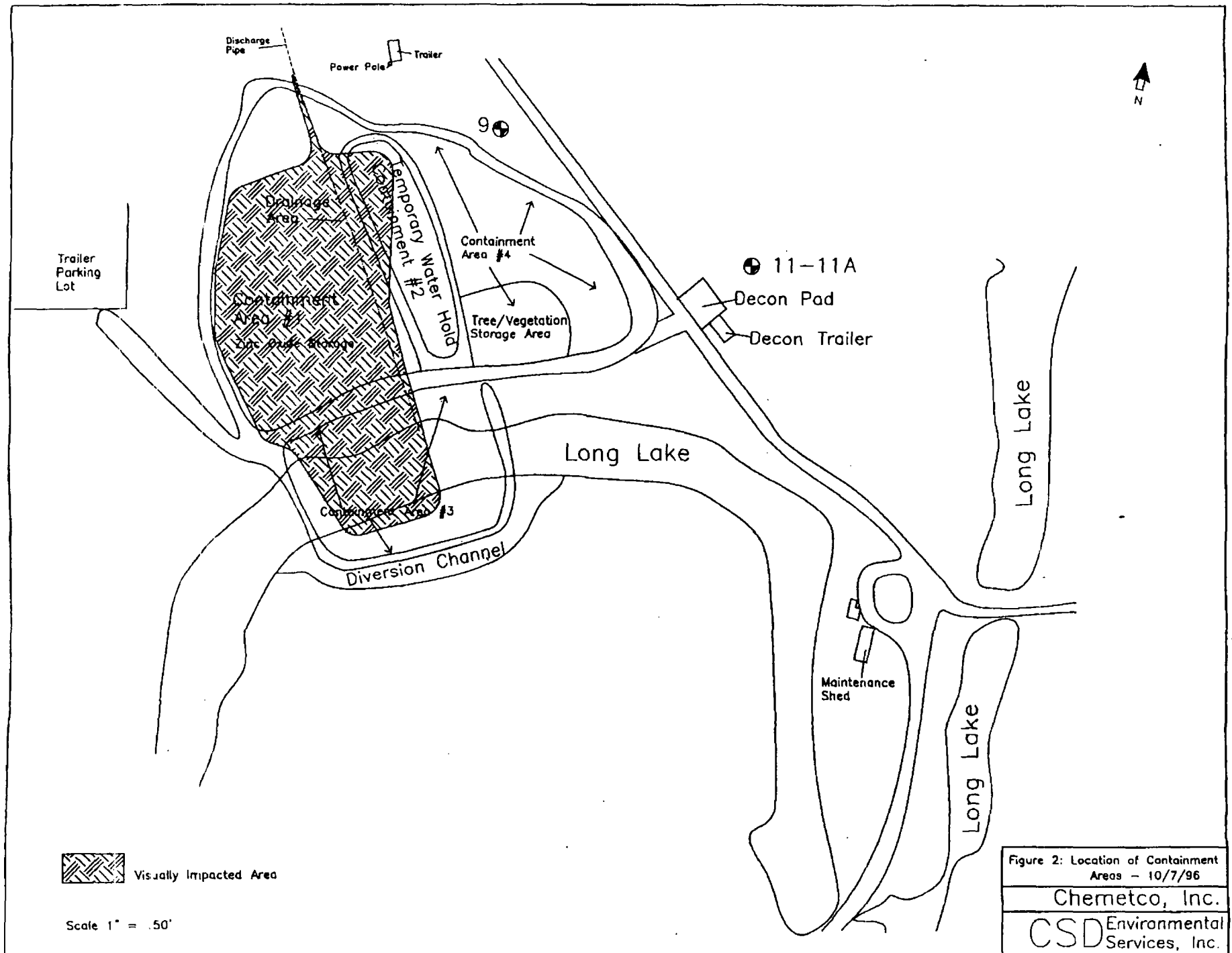


Figure 2: Location of Containment Areas - 10/7/96

Chemetco, Inc.

CSD Environmental Services, Inc.

**ATTACHMENT 1**  
**SAMPLE RESULTS FROM ENVIRONMENTAL ANALYSIS**

TEST RESULTS REPORT  
FOR CHEMETCO

LOG NUMBER	SAMPLE DESCRIPTION	RESULTS OF ANALYSIS	UNITS OF MEASURE
1815410	X101 c SAMPLE DATE:09/18/96		
	TCLP Lead	428	mg Pb/l
	TCLP Cadmium	26.8	mg Cd/l
	TCLP Zinc	1740	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	3.10	% w/w
	Cadmium	754	ug/g
	Zinc	6.11	% w/w
	pH Value	8.25	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815411	X102 c SAMPLE DATE:09/18/96		
	TCLP Lead	76.2	mg Pb/l
	TCLP Cadmium	18.7	mg Cd/l
	TCLP Zinc	2920	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	4.66	% w/w
	Cadmium	799	ug/g
	Zinc	8.28	% w/w
	pH Value	8.63	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815412	X103 c SAMPLE DATE:09/18/96		
	TCLP Lead	191	mg Pb/l
	TCLP Cadmium	27.4	mg Cd/l
	TCLP Zinc	2800	mg Zn/l
	Total Metals Prep for solids	1	
	Lead	5.71	% w/w
	Cadmium	1254	ug/g
	Zinc	10.7	% w/w
	pH Value	8.85	10% Soln
	TC Leaching Proc.	Vol.55,#61	Fed.Reg.
	Total Metals Prep/Microwave	09/25/96	
1815413	S001 c SAMPLE DATE:09/18/96		
	Cadmium	2.44	mg Cd/l
	Zinc	6.78	mg Zn/l
	Total Metals Prep/GTF AA	09/26/96	
	Lead	4.15	mg Pb/l
	Total Metals Prep/Microwave	09/25/96	

**ATTACHMENT 2**  
**MSDS SHEET FOR CODE L LIME**

**MISSISSIPPI LIME COMPANY - MATERIAL SAFETY DATA SHEET**  
**OSHA HAZARD COMMUNICATION**

<b>PRODUCT IDENTIFICATION</b> Case L	<b>CHEMICAL ABSTRACT NUMBER</b> MIXTURE	<b>DATE PREPARED</b> 05-May-85
---	--	-----------------------------------

**Section I**

<b>Manufacturer</b>  Mississippi Lime Company P.O. Drawer #1 Highway 61 Sta. Genevieve, MO 63870	<b>24 Hour Emergency Contact Number</b> (800) 437-8463	<b>HMSR RATING</b>	
	<b>Telephone Number for Information</b> (800) 437-8463	Health	3
	<b>Signature of Preparer</b> <i>Mark B. Adams</i>	Flammability	0
		Reactivity	2
		Protective Equip.	E

**Section II - Hazardous Ingredients / Identity Information**

Hazardous Constituents (Specific Chemical Identity, Common Name(s))		OSHA PEL	ADGHI TLV	Other Limits Recommended	% (Optional)
Calcium Oxide, Crystalline	CAS 1305-78-8	5 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>		to 45 %
Calcium Hydroxide	CAS 1305-62-0	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>		to 85 %
Crystalline Silica (Amorph)	CAS 1408-80-7	0.1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>		(0.1 to 0.5 %)

Case L is not listed on the NTP, IARC, or OSHA lists of carcinogens. Crystalline silica, a component of this product, is listed by IARC and NTP but not by OSHA. IARC classifies crystalline silica as "probably carcinogenic to humans" on the basis that there is limited evidence for carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals. "Limited evidence" means that a causal relationship is possible; however, other explanations such as a chance, bias or confounding factors cannot adequately be excluded. NTP also classifies crystalline silica on the basis of limited evidence as "a substance which may reasonably be anticipated to be a carcinogen" (Rev. 11/83).

**Section III - Physical / Chemical Characteristics**

<b>Boiling Point (Calcium Oxide)</b>	6162 °F	<b>Specific Gravity (H<sub>2</sub>O = 1)</b>	3.00
<b>Vapor Pressure (mm Hg)</b>	NA	<b>Melting Point</b>	1076 °F
<b>Vapor Density (Air = 1)</b>	NA	<b>Evaporation Rate</b>	NA
<b>Solubility in Water</b>	0.2 % @ 0 °C		
<b>Appearance and Color</b>	Tan powder, odorless		

**Section IV - Fire and Explosion Hazard Data**

<b>Flash Point</b>	NA	<b>Flammable Limits</b>	NA
<b>Extinguishing Method</b>	NA		
<b>Special Fire Fighting Procedures</b>	NA		
<b>Unusual Fire and Explosion Hazards</b>	NA		

**Section V - Reactivity Data**

Stability	Unstable		Conditions to Avoid -	NA
	Stable	X		
Incompatibility (Materials to Avoid)			Acids, Fluorine	
Hazardous Decomposition or Byproducts			None	
Hazardous Polymerization	May Occur		Conditions to Avoid -	NA
	Will Not Occur	X		

**MISSISSIPPI LIME COMPANY - MATERIAL SAFETY DATA SHEET**  
**OSHA HAZARD COMMUNICATION**

<b>PRODUCT IDENTIFICATION</b> Code L	<b>CHEMICAL ABSTRACT NUMBER</b> MIXTURE	<b>DATE PREPARED</b> 05-May-88
---	--	-----------------------------------

**Section VI - Health Hazard Data**

Route(s) of Entry	Inhalation? YES	Skin? YES	Ingestion? YES
Health Hazards	Acute	Corrosive to skin and eyes. Causes irritation and inflammation to mucous membranes and respiratory passages.	
	Chronic	Long term exposure can cause irritation, ulceration and perforation of nasal septum.	
Carcinogenicity	NTP?	ARC Monographs?	OSHA Regulated?
Oxide and Hydroxide	NO	NO	NO
Crystalline Silica	YES	YES	Not an carcinogen
Signs and Symptoms of Exposure	Irritation of skin, eyes, and respiratory tract.		
Medical Conditions Exacerbated by Exposure	Respiratory disease, skin condition.		
Emergency and First Aid Procedures	Remove to fresh air. Wash dust with soap and water. Flush out eyes with generous amounts of water. Drink plenty of water if swallowed. See Physician.		

**Section VII - Precautions for Safe Handling**

Steps To Be Taken In Case Material is Released or Spilled	Normal clean-up procedures. Care should be taken to avoid causing dust to become airborne. Vacuum cleaning systems are recommended.
Waste Disposal Method	Dispose of in accordance with Federal, State and Local regulations.
Precautions to Be Taken in Handling	Store away from incompatible substances
Other Precautions	None

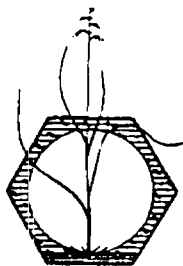
**Section VIII - Control Measures**

<b>Respiratory Protection</b>			
Dust filter mask			
Ventilation	Local Exhaust - Mechanics (-)	To Maintain TLVs and PEL's To Maintain TLVs and PEL's	Special - NA Other - NA
<b>Protective Gloves</b>			
Leather or Rubber			
<b>Eye Protection</b>			
Well fitted goggles			
<b>Other Protective Clothing</b>			
Long sleeve shirts and pants			
<b>Work/Hygiene Practices</b>			
Maintain dust exposure levels below TLVs and PEL's. If not possible use respiratory protection.			

**Section IX - Transportation**

Not regulated by Department of Transportation unless product is shipped by air.
---

**ATTACHMENT 3**  
**SAMPLE RESULTS FROM PRAIRIE ANALYTICAL SYSTEMS, INC.**



# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 25 September 1996  
Date Received: 26 September 1996  
Date Analyzed: 27 September 1996  
Date Reported: 27 September 1996

Project: Chemetco

PAS Project Code: CSD-120

Sample Description:  
PAS Sample No.:

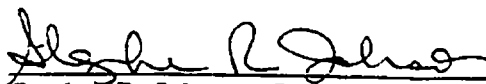
E-1                      E-2                      E-3  
9609263995    9609263996    9609263997

## TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.004	26.5	21.3	2.22	6010A
Lead	0.042	195	80.1	0.20	6010A
Zinc	0.002	1083	801	49.7	6010A

## Miscellaneous Analysis

Parameters	Detection Limit	Result	Result	Result	E.P.A. Method
pH (Units)	—	8.63	8.26	4.72	9045B

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-TCLPM



# Chain of Custody Record

Page \_\_\_\_ of \_\_\_\_

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

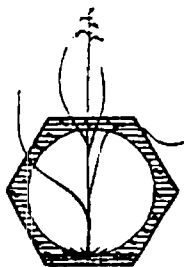
Client	CSD Environmental	Project	Chemo
Address	2220 Yale Blvd.	Contact Person	Marc Sinnering
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	
Phone Number	522-4085	Facsimile Number	

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
E-1		9/25	3:00p	4oz	1		pH, TCLP (Pb, Cd, Zn)	3995
E-2		"	3:20p	"	1		"	3996
E-3		"	3:30p	"	1		"	3997
W-1		"	4:22p	500mL	1		" total Pb, Cd, Zn per Harry C.	3998
							9/26/96 9:05 am	

Relinquished by: <i>Sarah A. Thayer</i>	Received by: <i>Sarah A. Thayer</i>
Date: <i>9/26/96</i> Time: <i>9:00 am</i>	Date: <i>9/26/96</i> Time: <i>9:00 am</i>
Relinquished by:	Received by:
Date:	Date:
Time:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: *CSD-120*



# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 25 September 1996  
Date Received: 26 September 1996  
Date Analyzed: 27 September 1996  
Date Reported: 27 September 1996

Project: Chemetco

PAS Project Code: CSD-120

Sample Description: W-1


PAS Sample No.: 9609263998

## Total Metal Analysis

Analytes	Detection Limit mg/l	Result mg/l	E.P.A. Method
Cadmium, Total	0.004	1.09	6010A
Lead, Total	0.042	0.64	6010A
Zinc, Total	0.002	2.59	6010A

## Miscellaneous Analysis

Parameters	Detection Limit	Result	E.P.A. Method
pH (Units)	—	8.29	9040A

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-RWMETAL



**Chemetco, Inc.**  
**1198010003—Madison County**  
**Zinc Oxide Spill Remediation Plan**  
**April 1997**

**ATTACHMENT 2**

**Corp of Engineers Permit**



State of Illinois

# ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

217/782-0610

September 24, 1996

St. Louis District  
Corps of Engineers  
122 Spruce Street  
St. Louis, Missouri 63103

Re: Chemetco (Madison County)  
Cleanup of zinc oxide  
Log # C-1318-96 [CoE appl. # ]

Gentlemen:

This Agency received a request on September 20, 1996 from Chemetco requesting necessary comments concerning the cleanup operations due to a zinc oxide spill in Hartford. We offer the following comments.

Based on the information included in this submittal, it is our engineering judgment that the proposed project may be completed without causing water pollution as defined in the Illinois Environmental Protection Act, provided the project is carefully planned and supervised.

These comments are directed at the effect on water quality of the construction procedures involved in the above described project and are not an approval of any discharge resulting from the completed facility, nor an approval of the design of the facility. These comments do not supplant any permit responsibilities of the applicant toward the Agency.

This Agency hereby issues certification under Section 401 of the Clean Water Act (PL 95-217), subject to the applicant's compliance with the following conditions:

1. The applicant shall not cause:
  - a. violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulation;
  - b. water pollution defined and prohibited by the Illinois Environmental Protection Act; or
  - c. interference with water use practices near public recreation areas or water supply intakes.
2. The applicant shall provide adequate planning and supervision during the project construction period for implementing construction methods, processes and cleanup procedures necessary to prevent water pollution and control erosion.

Printed on Recycled Paper

SEP 27 '96 14:07

2175224085

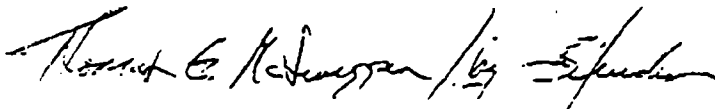
PAGE.02

3. Any spoil material excavated, dredged or otherwise produced must not be returned to the waterway but must be deposited in a self-contained area in compliance with all state statutes, regulations and permit requirements with no discharge to waters of the State unless a permit has been issued by this Agency. Any backfilling must be done with clean material and placed in a manner to prevent violation of applicable water quality standards.
4. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching. All construction within the waterway shall be conducted during zero or low flow conditions. The applicant shall be responsible for obtaining an NPDES Storm Water Permit prior to initiating construction if the construction activity associated with the project will result in the disturbance of 5 (five) or more acres, total land area. An NPDES Storm Water Permit may be obtained by submitting a properly completed Notice of Intent (NOI) form by certified mail to the Agency's Division of Water Pollution Control, Permit Section.
5. The applicant shall implement erosion control measures consistent with the "Standards and Specifications for Soil Erosion and Sediment Control" (IEPA/WPC/87-012).
6. The channel relocation shall be constructed under dry conditions and stabilized to prevent erosion prior to the diversion of flow.
7. Clean material shall be used for the dam construction.
8. All spoil material excavated shall be disposed in accordance with 35 Ill. Adm. Code, Subtitle G. The applicant shall provide analytical results of the contaminated excavated spoil material to the Illinois EPA, Division of Land Pollution Control for approval prior to disposal.

This certification becomes effective when the Department of the Army, Corps of Engineers, includes the above condition #1 through # 8 as conditions of the requested permit issued pursuant to Section 404 of PL 95-217.

This certification does not grant immunity from any enforcement action found necessary by this Agency to meet its responsibilities in prevention, abatement, and control of water pollution.

Very truly yours,



Thomas G. McSwiggin, P. E.  
Manager, Permit Section  
Division of Water Pollution Control  
TGM:BY:VMK:13180924.96c  
cc: IEPA, Records Unit  
IEPA, DWPC, FOS, Collinsville  
IDNR, OWR, Springfield  
USEPA, Region 5  
Chemetco  
CSD Environmental



DEPARTMENT OF THE ARMY

ST. LOUIS DISTRICT, CORPS OF ENGINEERS  
1222 SPRUCE STREET  
ST. LOUIS, MISSOURI 63103-2833

REPLY TO  
ATTENTION OF:

September 21, 1996

Regulatory Branch  
File No. 199610990

Chemetco  
Post Office Box 67  
Hartford, Illinois 62048

Gentlemen:

We have reviewed your facsimile of September 20, 1996, requesting emergency authorization to conduct remedial actions for a recent Zinc Oxide spill affecting Long Lake. The clean-up efforts would involve constructing an earthen levee, averaging 2 to 5 feet high and 10 feet wide, around the perimeter of the affected area. A five-foot-high levee with a poly liner and rock cap would be constructed within the perimeter of the earthen levee, directly adjacent to the affected portion of Long Lake, to serve as a containment area. The dammed portion of Long Lake would be dewatered and excavated to remove the presence of Zinc Oxide. This material would be pumped over the adjacent lined and rock capped levee for further remedial action. An unnamed tributary to Long Lake, flowing into the affected area, would have to be diverted around the earthen levee for an approximate 700-foot-long reach to maintain flows. In addition, an approximate 450-foot-long by 25-foot-wide by 4-foot-deep channel would be excavated to keep Long Lake connected below the dammed off portion. The subject activity site is located approximately 4 miles directly south of Hartford, near Oldenburg, in Madison County, Illinois.

We have determined that the proposed project is authorized under Section 404 of the Clean Water Act by existing Department of the Army nationwide permits as described in 33 CFR 330, Appendix A (B) (38). Enclosed is a copy of the nationwide permit, and terms and conditions (marked in red) with which you must comply.

The Illinois Environmental Protection Agency has denied water quality certification for these permits. You must obtain individual water quality certification or generic 401 certification or provide to the Corps a copy of the application to the state for the certification. If the IEPA fails to act within a reasonable period of time (60 days from the date of this letter), a waiver will be presumed. Upon receipt of water quality certification, the proposed work is authorized. If the water quality certification is conditioned by the state, these conditions will become part of the Corps permits. The District Engineer has conditioned this permit to include the following:

a. Any excess material associated with the activities of this project will not be discharged into either aquatic areas or wetland areas.

b. All excess material will be removed to upland sites and not stored or abandoned within the floodplain area.

c. The applicant shall ensure that the project not cause:  
(1) violation of applicable water quality standards of the Illinois Pollution Control Board, Title 35, Subtitle C: Water Pollution Rules and Regulations; (2) water pollution as defined and prohibited by the Illinois Environmental Protection Act; and  
(3) interference with water use practices near public recreation areas or water supply intakes.

d. All areas affected by construction shall be mulched and seeded as soon after construction as possible. The applicant shall undertake necessary measures and procedures to reduce erosion during construction. Interim measures to prevent erosion during construction shall be taken and may include the installation of staked straw bales, sedimentation basins and temporary mulching.

e. All impacted areas including, but not limited to, Long Lake, the unnamed tributary, and wetland sites will be returned to their pre-spill and pre-project conditions upon completion of the remedial actions. A restoration plan must be submitted to this office within six months from the date of this letter and all restoration activities must be completed within one year from the date of this letter.

This determination is applicable only to the permit program administered by the Corps of Engineers. It does not eliminate the need to obtain other Federal, state, or local approvals before beginning work.

You are reminded that the permit is based on submitted plans. Variations from these plans shall constitute a violation of Federal law and may result in the revocation of the permit. This verification will be valid until the nationwide permit is modified, reissued, or revoked prior to January 21, 1997. It is incumbent upon you to remain informed of changes to the nationwide permits. We will issue a public notice announcing the changes when they occur. Furthermore, if you commence, or are under contract to commence, this activity before the date the nationwide permit is modified or revoked you will complete the activity under the present terms and conditions of the nationwide permit.

If the proposed project does not satisfy all conditions as indicated, please contact Charles Frerker at (314) 331-8583 for advice or information you may need in preparing an application for an individual permit.

Sincerely,



Michael Ricketts  
Corps/Rivers Project Manager

Enclosure

Copy Furnished: (w/o enclosure)

Mr. Bruce Yurdin  
Illinois Environmental Protection Agency  
DWPC, Permit Section, Watershed Unit  
2200 Churchill Road  
Springfield, Illinois 62794-9276

Mr. Robert Dalton  
Illinois Department of Natural Resources  
Office of Water Resources  
3215 Executive Park Drive  
Post Office Box 19484  
Springfield, Illinois 62794-9484

Ms. Joyce Collins  
U.S. Department of the Interior  
Fish and Wildlife Service (ES)  
Rural Route 3 , Box 328  
Marion, Illinois 62959-9579

Mr. Gerald D. Winn  
U.S. Environmental Protection Agency  
Region V  
Wetland Protection Section (5WQW-16J)  
77 West Jackson Boulevard  
Chicago, Illinois 60604

Ms. Anne Haaker  
State Historic Preservation Office  
Illinois Historic Preservation Agency  
State Capitol  
Springfield, Illinois 62701

Mr. Robert Schanzle  
Illinois Department of Natural Resources  
524 South Second Street  
Springfield, Illinois 62701-1787

include a statement that the verification will remain valid for the specified period of time, if during that time period, the NWP authorization is reissued without modification or the activity complies with any subsequent modification of the NWP authorization. Furthermore, the response should include a statement that the provisions of § 330.8(b) will apply, if during that period of time, the NWP authorization expires, or is suspended or revoked, or is modified, such that the activity would no longer comply with the terms and conditions of an NWP. Finally, the response should include any known expiration date that would occur during the specified period of time. A period of time less than two years may be used if deemed appropriate.

(iii) For activities where a state has denied 401 water quality certification and/or did not agree with the Corps consistency determination for an NWP the DE's response will state that the proposed activity meets the terms and conditions for authorization under the NWP with the exception of a state 401 water quality certification and/or CZM consistency concurrence. The response will also indicate the activity is denied without prejudice and cannot be authorized until the requirements of §§ 330.4(c)(3), 330.4(c)(6), 330.4(d)(3), and 330.4(d)(6) are satisfied. The response will also indicate that work may only proceed subject to the terms and conditions of the state 401 water quality certification and/or CZM concurrence.

(iv) Once the DE has provided such verification, he must use the procedures of 33 CFR 330.5 in order to modify, suspend, or revoke the authorization.

(b) *Expiration of nationwide permits.* The Chief of Engineers will periodically review NWPs and their conditions and will decide to either modify, reissue, or revoke the permits. If an NWP is not modified or reissued within five years of its effective date, it automatically expires and becomes null and void. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon an NWP will remain authorized provided the activity is completed within twelve months of the date of an NWP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 330.4(e) and 33 CFR 330.5 (c) or (d). Activities completed under the authorization of an NWP which was in effect at the time the activity was

completed continue to be authorized by that NWP.

(c) *Multiple use of nationwide permits.* Two or more different NWPs can be combined to authorize a "single and complete project" as defined at 33 CFR 330.2(i). However, the same NWP cannot be used more than once for a single and complete project.

(d) *Combining nationwide permits with individual permits.* Subject to the following qualifications, portions of a larger project may proceed under the authority of the NWPs while the DE evaluates an individual permit application for other portions of the same project, but only if the portions of the project qualifying for NWP authorization would have independent utility and are able to function or meet their purpose independent of the total project. When the functioning or usefulness of a portion of the total project qualifying for an NWP is dependent on the remainder of the project, such that its construction and use would not be fully justified even if the Corps were to deny the individual permit, the NWP does not apply and all portions of the project must be evaluated as part of the individual permit process.

(1) When a portion of a larger project is authorized to proceed under an NWP, it is with the understanding that its construction will in no way prejudice the decision on the individual permit for the rest of the project. Furthermore, the individual permit documentation must include an analysis of the impacts of the entire project, including related activities authorized by NWP.

(2) NWPs do not apply, even if a portion of the project is not dependent on the rest of the project, when any portion of the project is subject to an enforcement action by the Corps or EPA.

(e) *After-the-fact authorizations.* These authorizations often play an important part in the resolution of violations. In appropriate cases where the activity complies with the terms and conditions of an NWP, the DE can elect to use the NWP for resolution of an after-the-fact permit situation following a consideration of whether the violation being resolved was knowing or intentional and other indications of the need for a penalty. For example, where an unauthorized fill meets the terms and conditions of NWP 13, the DE can consider the appropriateness of allowing the residual fill to remain, in situations where said fill would normally have been permitted under NWP 13. A knowing, intentional, willful violation should be the subject of an enforcement action leading to a penalty, rather than

an after-the-fact authorization. Use of after-the-fact NWP authorization must be consistent with the terms of the Army/EPA Memorandum of Agreement on Enforcement. Copies are available from each district engineer.

#### Appendix A to Part 330—Nationwide Permits and Conditions

##### A. Index of the Nationwide Permits and Conditions

###### Nationwide Permits

1. Aids to Navigation
2. Structures in Artificial Canals
3. Maintenance
4. Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities
5. Scientific Measurement Devices
6. Survey Activities
7. Outfall Structures
8. Oil and Gas Structures
9. Structures in Floating and Anchorage Areas
10. Mooring Buoys
11. Temporary Recreational Structures
12. Utility Line Backfill and Bedding
13. Bank Stabilization
14. Road Crossing
15. U.S. Coast Guard Approved Bridges
16. Return Water From Upland Containers Disposal Areas
17. Hydropower Projects
18. Minor Discharges
19. 25 Cubic Yard Dredging
20. Oil Spill Cleanup
21. Surface Mining Activities
22. Removal of Vessels
23. Approved Categorical Exclusions
24. State Administered Section 404 Program
25. Structural Discharge
26. Headwaters and Isolated Waters Discharges
27. Wetland Restoration Activities
28. Modifications of Existing Marinas
29. Reserved
30. Reserved
31. Reserved
32. Completed Enforcement Actions
33. Temporary Construction and Access
34. Cranberry Production Activities
35. Maintenance Dredging of Existing Basins
36. Boat Ramps
37. Emergency Watershed Protection
38. Cleanup of Hazardous and Toxic Waste
39. Reserved
40. Farm Buildings

###### Nationwide Permit Conditions

###### General Conditions

1. Navigation
2. Proper Maintenance
3. Erosion and Sediment Controls
4. Aquatic Life Movements
5. Equipment
6. Regional and Case-By-Case Construction
7. Wild and Scenic Rivers
8. Tribal Rights
9. Water Quality Certification
10. Coastal Zone Management
11. Endangered Species
12. Historic Properties
13. Notification

dispersed by currents or other forces. The DE may extend the period of temporary side-casting up to 180 days, where appropriate. The area of waters of the United States that is disturbed must be limited to the minimum necessary to construct the utility line. In wetlands, the top 8" to 12" of the trench should generally be backfilled with topsoil from the trench. Excess material must be removed to upland areas immediately upon completion of construction. Any exposed slopes and streambanks must be stabilized immediately upon completion of the utility line. The utility line itself will require a Section 10 permit if in navigable waters of the United States. (See 33 CFR part 322). (section 404)

**13. Bank Stabilization.** Bank stabilization activities necessary for erosion prevention provided:

- a. No material is placed in excess of the minimum needed for erosion protection;
- b. The bank stabilization activity is less than 500 feet in length;
- c. The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line;
- d. No material is placed in any special aquatic site, including wetlands;
- e. No material is of the type or is placed in any location or in any manner so as to impair surface water flow into or out of any wetland area;
- f. No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and tree-tops may be used in low energy areas); and,
- g. The activity is part of a single and complete project.

Bank stabilization activities in excess of 500 feet in length or greater than an average of one cubic yard per running foot may be authorized if the permittee notifies the district engineer in accordance with the "Notification" general condition and the district engineer determines the activity complies with the other terms and conditions of the nationwide permit and the adverse environmental impacts are minimal both individually and cumulatively. (sections 10 and 404)

**14. Road Crossing.** Fills for roads crossing waters of the United States (including wetlands and other special aquatic sites) provided:

- a. The width of the fill is limited to the minimum necessary for the actual crossing;
- b. The fill placed in waters of the United States is limited to a filled area of no more than 1/4 acre. Furthermore, no

more than a total of 200 linear feet of the fill for the roadway can occur in special aquatic sites, including wetlands;

c. The crossing is culverted, bridged or otherwise designed to prevent the restriction of, and to withstand, expected high flows and tidal flows, and to prevent the restriction of low flows and the movement of aquatic organisms;

d. The crossing, including all attendant features, both temporary and permanent, is part of a single and complete project for crossing of a water of the United States; and,

e. For fills in special aquatic sites, including wetlands, the permittee notifies the district engineer in accordance with the "Notification" general condition. The notification must also include a delineation of affected special aquatic sites, including wetlands.

Some road fills may be eligible for an exemption from the need for a Section 404 permit altogether (see 33 CFR 323.4). Also, where local circumstances indicate the need, district engineers will define the term "expected high flows" for the purpose of establishing applicability of this nationwide permit. (sections 10 and 404)

**15. U.S. Coast Guard Approved Bridges.** Discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the United States, including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided such discharges have been authorized by the U.S. Coast Guard as part of the bridge permit. Causeways and approach fills are not included in this nationwide permit and will require an individual or regional section 404 permit. (section 404)

**16. Return Water From Upland Contained Disposal Areas.** Return water from an upland, contained dredged material disposal area. The dredging itself requires a section 10 permit if located in navigable waters of the United States. The return water from a contained disposal area is administratively defined as a discharge of dredged material by 33 CFR 323.2(d) even though the disposal itself occurs on the upland and thus does not require a section 404 permit. This nationwide permit satisfies the technical requirement for a section 404 permit for the return water where the quality of the return water is controlled by the state through the section 401 certification procedures. (section 404)

**17. Hydropower Projects.** Discharges of dredged or fill material associated with (a) small hydropower projects at existing reservoirs where the project,

which includes the fill, is licensed by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act of 1920, as amended; and has a total generating capacity of not more than 5000 KW; and the permittee notifies the district engineer in accordance with the "Notification" general condition; or (b) hydropower projects for which the FERC has granted an exemption from licensing pursuant to section 408 of the Energy Security Act of 1980 (16 U.S.C. 2705 and 2708) and section 30 of the Federal Power Act, as amended; provided the permittee notifies the district engineer in accordance with the "Notification" general condition. (section 404)

**18. Minor Discharges.** Minor discharges of dredged or fill material into all waters of the United States provided:

a. The discharge does not exceed 25 cubic yards;

b. The discharge will not cause the loss of more than 1/4 acre of a special aquatic site, including wetlands. For the purposes of this nationwide permit, the acreage limitation includes the filled area plus special aquatic sites that are adversely affected by flooding and special aquatic sites that are drained so that they would no longer be a water of the United States as a result of the project;

c. If the discharge exceeds 10 cubic yards or the discharge is in a special aquatic site, including wetlands, the permittee notifies the district engineer in accordance with the "Notification" general condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. (Also see 33 CFR 330.1(e)); and

d. The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project and is not placed for the purpose of stream diversion. (sections 10 and 404)

**19. Minor Dredging.** Dredging of no more than 25 cubic yards below the plane of the ordinary high water mark or the mean high water mark from navigable waters of the United States as part of a single and complete project. This nationwide permit does not authorize the dredging or degradation through siltation of coral reefs, submerged aquatic vegetation, anadromous fish spawning areas, or wetlands or, the connection of canals or other artificial waterways to navigable waters of the United States (see 33 CFR 322.5(g)). (section 10)

**20. Oil Spill Cleanup.** Activities required for the containment and

activities associated with the restoration of altered and degraded non-tidal wetlands, riparian areas and creation of wetlands and riparian areas on U.S. Forest Service and Bureau of Land Management lands, Federal surplus lands (e.g., military lands proposed for disposal), Farmers Home Administration inventory properties, and Resolution Trust Corporation inventory properties that are under Federal control prior to being transferred to the private sector. Such activities include, but are not limited to: installation and maintenance of small water control structures, dikes, and berms; backfilling of existing drainage ditches; removal of existing drainage structures; construction of small nesting islands; and other related activities. This nationwide permit applies to restoration projects that serve the purpose of restoring "natural" wetland hydrology, vegetation, and function to altered and degraded non-tidal wetlands and "natural" functions of riparian areas. For agreement restoration and creation projects only, this nationwide permit also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its prior condition and use (i.e., prior to restoration under the agreement) within five years after expiration of the limited term wetland restoration or creation agreement; even if the discharge occurs after this nationwide permit expires. The prior condition will be documented in the original agreement, and the determination of return to prior conditions will be made by the Federal agency executing the agreement. Once an area is reverted back to its prior physical condition, it will be subject to whatever the Corps regulatory requirements will be at that future date. This nationwide permit does not authorize the conversion of natural wetlands to another aquatic use, such as creation of waterfowl impoundments where a forested wetland previously existed. (sections 10 and 404)

**28. Modifications of Existing Marinas.** Reconfigurations of existing docking facilities within an authorized marina area. No dredging, additional slips or dock spaces, or expansion of any kind within waters of the United States are authorized by this nationwide permit. (section 10)

29. Reserved

30. Reserved

31. Reserved

**32. Completed Enforcement Actions.** Any structure, work or discharge of dredged or fill material undertaken in accordance with, or remaining in place in compliance with, the terms of a final Federal court decision, consent decree,

or settlement agreement in an enforcement action brought by the United States under section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act of 1899. (sections 10 and 404)

**33. Temporary Construction, Access and Dewatering.** Temporary structures and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites; provided the associated permanent activity was previously authorized by the Corps of Engineers or the U.S. Coast Guard, or for bridge construction activities not subject to Federal regulation. Appropriate measures must be taken to maintain near normal downstream flows and to minimize flooding. Fill must be of materials and placed in a manner that will not be eroded by expected high flows. Temporary fill must be entirely removed to upland areas following completion of the construction activity and the affected areas restored to the pre-project conditions. Cofferdams cannot be used to dewater wetlands or other aquatic areas so as to change their use. Structures left in place after cofferdams are removed require a section 10 permit if located in navigable waters of the United States. (See 33 CFR part 322). The permittee must notify the district engineer in accordance with the "Notification" general condition. The notification must also include a restoration plan of reasonable measures to avoid and minimize impacts to aquatic resources. The district engineer will add special conditions, where necessary, to ensure that adverse environmental impacts are minimal. Such conditions may include: limiting the temporary work to the minimum necessary; requiring seasonal restrictions; modifying the restoration plan; and requiring alternative construction methods (e.g. construction mats in wetlands where practicable). This nationwide permit does not authorize temporary structures or fill associated with mining activities or the construction of marina basins which have not been authorized by the Corps. (sections 10 and 404)

**34. Cranberry Production Activities:** Discharges of dredged or fill material for dikes, berms, pumps, water control structures or leveling of cranberry beds associated with expansion, enhancement, or modification activities at existing cranberry production operations provided:

a. The cumulative total acreage of disturbance per cranberry production operation, including but not limited to, filling, flooding, ditching, or clearing,

does not exceed 10 acres of waters of the United States, including wetlands;

b. The permittee notifies the District Engineer in accordance with the notification procedures; and

c. The activity does not result in a net loss of wetland acreage.

This nationwide permit does not authorize any discharge of dredged or fill material related to other cranberry production activities such as warehouses, processing facilities, or parking areas. For the purposes of this nationwide permit, the cumulative total of 10 acres will be measured over the period that this nationwide permit is valid. (section 404)

**35. Maintenance Dredging of Existing Basins.** Excavation and removal of accumulated sediment for maintenance of existing marina basins, canals, and boat slips to previously authorized depths or controlling depths for ingress/egress whichever is less provided the dredged material is disposed of at an upland site and proper siltation controls are used. (section 10)

**36. Boat Ramps.** Activities required for the construction of boat ramps provided:

a. The discharge into waters of the United States does not exceed 50 cubic yards of concrete, rock, crushed stone or gravel into forms, or placement of pre-cast concrete planks or slabs. (Unsuitable material that causes unacceptable chemical pollution or is structurally unstable is not authorized);

b. The boat ramp does not exceed 20 feet in width;

c. The base material is crushed stone, gravel or other suitable material;

d. The excavation is limited to the area necessary for site preparation and all excavated material is removed to the upland; and

e. No material is placed in special aquatic sites, including wetlands.

Dredging to provide access to the boat ramp may be authorized by another NWP, regional general permit, or individual permit pursuant to section 10 if located in navigable waters of the United States. (sections 10 and 404)

**37. Emergency Watershed Protection and Rehabilitation.** Work done by or funded by the Soil Conservation Service qualifying as an "emergency" situation (requiring immediate action) under its Emergency Watershed Protection Program (7 CFR part 624) and work done or funded by the Forest Service under its Burned-Area Emergency Rehabilitation Handbook (FSH 509.13) provided the district engineer is notified in accordance with the notification general

(ii) The SHPO regarding the presence of any historic properties in the permit area that may be affected by the proposed project; and the available information, if any, provided by that agency.

(c) The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PDN and must include all of the information required in (b) (1)-(5) of General Condition 13.

(d) In reviewing an activity under the notification procedure, the District Engineer will first determine whether the activity will result in more than minimal individual or cumulative adverse environmental effects or will be contrary to the public interest. The prospective permittee may, at his option, submit a proposed mitigation plan with the predischARGE notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the nationwide permits and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. The district engineer will upon receipt of a notification provide immediately (e.g. facsimile transmission, overnight mail or other expeditious manner) a copy to the appropriate offices of the Fish and Wildlife Service, State natural resource or water quality agency, EPA, and, if appropriate, the National Marine Fisheries Service. With the exception of NWP 37, these agencies will then have 5 calendar days from the date the material is transmitted to telephone the District Engineer if they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 10 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification. If the District Engineer determines that the activity complies with the terms and conditions of the

NWP and that the adverse effects are minimal, he will notify the permittee and include any conditions he deems necessary. If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; or (2) that the project is authorized under the nationwide permit subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level. This mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the DE will expeditiously review the proposed mitigation plan, but will not commence a second 30-day notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant informing him that the project can proceed under the terms and conditions of the nationwide permit.

(e) *Wetlands Delineations:* Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period will not start until the wetland delineation has been completed.

(f) *Mitigation:* Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:

(1) To be practicable the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of overall project purposes;

(2) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, which contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands.

Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: reducing the size of the project; establishing buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring,

and enhancing similar functions and values. In addition, mitigation must address impacts and cannot be used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the nationwide permits (e.g. 5 acres of wetlands cannot be created to change a 6 acre loss of wetlands to a 1 acre loss; however, the 5 created acres can be used to reduce the impacts of the 6 acre loss).

#### *Section 404 Only Conditions*

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material and must be followed in order for authorization by the nationwide permits to be valid:

1. *Water supply intakes.* No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. *Shellfish production.* No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by nationwide permit 4.

3. *Suitable material.* No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, etc.) and material discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

4. *Mitigation.* Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site), unless the DE has approved a compensation mitigation plan for the specific regulated activity.

5. *Spawning areas.* Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

6. *Obstruction of high flows.* To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

7. *Adverse impacts from impoundments.* If the discharge creates an impoundment of water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

8. *Waterfowl breeding areas.* Discharges into breeding areas for



7/24/70

CSD

## CHEMETCO - CONSTRUCTION PLANS

1. CONSTRUCT ROAD WITH 3" MINUS AT A 2 FOOT HEIGHT BEGINNING FROM WEST SIDE OF PRIVATE LANE. GRADE INCREASES TO 5' HEIGHT AT LOCATION OF DRAINAGE DITCH. HEIGHT OF 5' IS MAINTAINED ~~FOR~~ APPROX 300' WHERE INTERCEPTS EARTHEN DAM.
2. LINE N SIDE OF ROAD WITH 2-10 mil POLY LINER AS A BARRIER TO HOLD WATER. CA-6 TO COVER POLY LINER
3. CREATE AN EARTHEN DAM 5' HIGH ON WEST SIDE OF SPILLED AREA. CREATE DRAINAGE SNALE TO <sup>SURFACE (RAIN)</sup> DIVERT WATER TO LONG LAKE AROUND THE IMPACTED AREA.
4. CONSTRUCT A DIVERSION CHANNEL 25' FEET WIDE x 3-5 FEET DEEP. ~~TO~~
5. CONSTRUCT 2 DAMS ON LONG LAKE. EAST DAM AFFLOY 10-12' WIDE. WEST DAM 15' WIDE
6. CONSTRUCTION ORDER
  - 1) BUILD ROCK DAM/ROAD
  - 2) EXCAVATE DIV. CHANNEL & BUILD DAM ~3' HIGH ON N SIDE OF CHANNEL.
  - 3) CONSTRUCT 15' WIDE DAM ON WEST SIDE
  - 4) CONSTRUCT 12' WIDE DAM ON EAST SIDE
  - 5) FINISH LAST PORTION OF DIV. CHANNEL

7/24/70  
CAB

TO RELEASE WATER.

7. TO REMOVE SPILLED MATERIAL FROM LAKE  
ONCE DAMMED:

A. TEMPORARY EARTH PLATFORM WILL BE  
CONSTRUCTION TO ALLOW TRACKSIDE  
ACCESS TO EXCAVATE. EXCAVATED  
MATERIAL TO BE DEPOSITED ON NORTH  
SIDE OF ROCK DAM/ROAD.

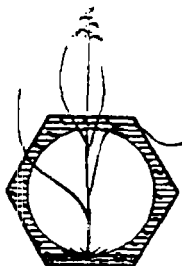
B. SOIL <sup>+ WATER</sup> SAMPLES WILL BE COLLECTED  
TO DETERMINE WHEN CLEANUP IS  
FINISHED. CLEAN UP #'S TO BE  
DETERMINED BY IEPA.

Trees - DEAD Present in ~~the~~ AFFECTED  
PORTION OF LAKE WILL BE REMOVED.

Chemetco, Inc.  
1198010003—Madison County  
Zinc Oxide Spill Remediation Plan  
April 1997

**ATTACHMENT 3**

**Initial Excavation Sample Results**



# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 09 October 1996  
Date Received: 10 October 1996  
Date Analyzed: 11 October 1996  
Date Reported: 11 October 1996

Project: Chemetco

PAS Project Code: CSD-122

Sample Description:  
Sample Number:

Long Lake 1   Long Lake 2   Long Lake 3  
9610104222   9610104223   9610104224

## Total Metals Analysis

Parameters	Detection Limit mg/kg	Result mg/kg	Result mg/kg	Result mg/kg	E.P.A. Method
Cadmium	0.004	56.3	8.3	16.1	6010A
Lead	0.001	27.1	75.5	333	7421
Zinc	0.002	519	498	716	6010A

## TCLP Metals Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.004	<0.004	<0.004	1.3	6010A
Lead	0.042	<0.042	<0.042	10.4	6010A
Zinc	0.002	4.5	4.9	77.1	6010A

Stephen R. Johnson, Laboratory Director  
Springfield, IL 62791-8326 • (217) 753-1148

P.O. Box 8326 • 205 Main Terminal • Capital Airport •



Page 1 of 1

Client	CSD ENVIRONMENTAL INC.	Project	CHEMETCO
Address	2220 YALE	Contact Person	M. SIMMERING / Cindy Davis
City, State, Zip	SPRINGFIELD IL 62703	P. O. #/ Invoice to:	CSD ENV. INC.
Phone Number	522-4085	Facsimile Number	522-4087

[illegible]

Relinquished by: <i>Man Smith</i>		Received by: <i>Sarah A. Fultz</i>	
Date: <i>10/9/96</i>	Time: <i>3:05 P.M.</i>	Date: <i>10/10/96</i>	Time: <i>10:00 am</i>
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

PAS Project CODE: CSD-122

Chemetco, Inc.  
1198010003--Madison County  
Zinc Oxide Spill Remediation Plan  
April 1997

**ATTACHMENT 4**

**Sampling and Analysis Plan - Zinc Oxide Spill**

**FILE COPY**

**CHEMETCO, INC.  
SAMPLING AND ANALYSIS PLAN  
FOR ZINC OXIDE SPILL AREA**

**Prepared by:**

**CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703**

**October 10, 1996**

**CSD**



**Environmental Services Inc.**

**2220 Yale Boulevard  
Springfield, IL 62703  
(217) 522-4085**

**CHEMETCO, INC.  
SAMPLING AND ANALYSIS PLAN  
FOR ZINC OXIDE SPILL AREA**

Prepared by:

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

October 10, 1996



## TABLE OF CONTENTS

1.0	Introduction . . . . .	Page 1
2.0	Sampling and Analysis . . . . .	Page 1
	2.1 Objectives . . . . .	Page 1
	2.2 Sampling Team Responsibilities . . . . .	Page 1
	2.2.1 Sampling Team Leader . . . . .	Page 1
	2.2.2 Sampling Team Members . . . . .	Page 2
	2.3 Sampling Summary . . . . .	Page 2
3.0	Site Characterization and Sampling Procedures . . . . .	Page 2
	3.1 Site Preparation for Soil Sampling . . . . .	Page 2
	3.2 Soil Sampling Procedures . . . . .	Page 2
	3.3 Analytical Program . . . . .	Page 4
	3.4 Sampling Methodologies . . . . .	Page 4
	3.5 Documentation . . . . .	Page 4
	3.6 Sample Numbering System and Labeling . . . . .	Page 4
	3.6.1 Labeling . . . . .	Page 5
	3.7 Sample Shipment . . . . .	Page 6
	3.8 Decontamination Procedures . . . . .	Page 6
	3.9 Miscellaneous . . . . .	Page 7
	3.9.1 Quality Assurance/Quality Control . . . . .	Page 7
	3.9.2 Air Emissions . . . . .	Page 7
	3.9.3 Personnel Safety and Fire Prevention . . . . .	Page 7
4.0	Site Investigation Report . . . . .	Page 7
5.0	Clean Up Objectives . . . . .	Page 8

**CHEMETCO, INC.**  
**SOIL SAMPLING AND ANALYSIS PLAN**  
**FOR ZINC OXIDE SPILL AREA**

## **1.0 INTRODUCTION**

Chemetco, Inc. (Chemetco) is a secondary copper smelter located at the intersection of Route 3 and Oldenberg Road in Hartford, IL. Chemetco was constructed in 1969 and began producing anode copper, cathode copper, crude lead-tin solder, zinc oxide and slag in 1970. The facility is located in an agricultural, light residential area south of Hartford, IL, about one mile east of the confluence of the Missouri and the Mississippi Rivers. On September 17, 1996 during a routine RCRA inspection, the Illinois Environmental Protection Agency (IEPA) and Chemetco discovered a spill of zinc oxide material from an abandoned pipe south of Oldenberg Road. The spill was found to have entered Long Lake at the southern portion of the plant property. The spill was contained on Chemetco's property. This Sampling and Analysis Plan was compiled to determine the appropriate sampling parameters, locations and clean up objectives of the spilled zinc oxide material. A map indicating the location of the spilled zinc oxide is provided as Figure 1.

## **2.0 SAMPLING AND ANALYSIS**

### **2.1 Objectives**

This Sampling and Analysis Plan (SAP) describes the activities associated with determining location of, and collection method for, samples to determine the levels of lead, cadmium and zinc which are proposed to remain in the soil.

### **2.2 Sampling Team Responsibilities**

Responsibilities of the sampling team are described below:

#### **2.2.1 Sampling Team Leader**

The sampling team leader (STL) will be responsible for conducting the sampling program, assuring the availability and maintenance of all sampling equipment and materials, and providing for shipping and packing materials. The STL will supervise and be responsible for the completion of all chain-of-custody records, proper handling and shipping of the samples collected, and the accurate completion of field log books. The STL will be present on-site whenever samples are collected.

#### 2.2.2 Sampling Team Member(s)

The sampling team member(s) (STM) will collect samples, transfer them for shipping, and decontaminate sampling equipment as directed by the STL.

#### 2.3 Sampling Summary

Soil samples will be collected from a grid interval and the sampling depths described in Section 3.2.

Soil samples will be analyzed using USEPA SW-846 method 9045 for pH, TCLP method 6010A for lead, cadmium and zinc. These analytical parameters were selected based on knowledge of the types of waste streams stored in these areas. The data will be evaluated in accordance with Section 5.0 of this plan.

### 3.0 SITE CHARACTERIZATION AND SAMPLING PROCEDURES

The following subsections present the procedures to be followed for site activities related to field surveys and sampling efforts.

#### 3.1 Site Preparation for Soil Sampling

Prior to collecting soil samples from Long Lake, the visible zinc oxide will be removed by a trackhoe and placed into a containment area labeled area #1 for temporary storage. Refer to Figure 2 for the location of the containment areas.

Prior to collecting soil samples from containment area #1, the visible zinc oxide will be removed and sold to Chemetco's existing zinc oxide customers.

Prior to collecting soil samples from containment area #2, the water temporarily stored within will be sampled. If sample results are below the current NPDES limits, the water will be discharged under the current NPDES permit. If the results are above current NPDES limits, the water will be transported to the plant and used as cooling tower make up water.

#### 3.2 Soil Sampling Procedures

The location of the soil sampling points are to be based upon the following equation:

$$GI = (A/\Pi)^{0.5}/2$$

where: A = area to be gridded in feet<sup>2</sup> , and GI = grid interval (feet)

Using the entire spill area a grid interval of 130' was derived. However, this interval resulted in only four sample locations within Long Lake. The grid interval was recalculated removing the area of Long Lake (referred to as CA-3 in the calculations) from the total area. The calculated area for containment areas 1,2, and 4 equals 161,000 feet<sup>2</sup>, resulting in a grid interval of 113'. The area of Long Lake (containment area #3) equals 50,000 feet<sup>2</sup>, resulting in a grid interval of 63'.

Samples will be collected where the grid lines cross. Figure 3 is a map of the approximate sample locations. The soil samples will be collected using a hand auger. Samples will be collected at two intervals, 0-6 inches and 18 - 24 inches in depth.

The soil will be sampled using the following procedures:

1. A decontaminated hand auger will be turned to the appropriate depth to obtain a representative sample;
2. The sample will be removed from the auger in the field and placed in a laboratory provided glass jar for shipping;
3. The sample jar will be immediately placed into a cooler chilled to 4 degrees Celsius; and
4. The samples will be transported to the laboratory within 24 hours of sample collection.

The hand auger will be decontaminated in accordance with the procedures discussed in Section 3.8. The any other equipment used will be decontaminated prior to and upon completion of sampling in accordance with the procedures in Section 3.8.

### 3.3 Analytical Program

All soil samples sent for chemical analysis will be analyzed for the group of parameters specified in Section 2.3 by Prairie Analytical Systems, Inc. located in Springfield, IL.

### 3.4 Sampling Methodologies

Before beginning to auger the site, the STL will become acquainted with the site features and the planned boring locations. Any movable structures will be cleared away from each location, if necessary. Equipment will be decontaminated prior to each new soil boring, following procedures included in Section 3.8.

### 3.5 Documentation

Sample collection will take place in the presence of a geologist. The geologist will log all borings and, at a minimum, will note the following:

- sample identification;
- date(s);
- sampling equipment used;
- sample depths;
- sample recovery;
- sample description; and
- remarks.

### 3.6 Sample Numbering System and Labeling

A sample numbering system will be used to allow tracking, retrieval, cross referencing of sample information and positive identification. Each sample submitted for chemical analysis will be assigned a unique sample identification number. The samples will be numbered as identified below.

1. For samples collected from containment area #1 the following number system shall be used:

CA-1 1 - 6"  
CA-1 1 - 18"

CA-1 will identify the sample as being derived from containment area #1, with the numerical designation identifying the sample order and the depth at which the sample was collected will be provided.

2. For samples collected from containment area #2 the following number system shall be used:

CA-2 1 - 6"  
CA-2 1 - 18"

CA-2 will identify the sample as being derived from containment area #2, with the numerical designation identifying the sample order and the depth at which the sample was collected will be provided.

3. For samples collected from Long Lake - Containment Area #3, the following number system shall be used:

CA-3 1 - 6"  
CA-3 1 - 18"

CA-3 will identify the sample as being derived from Long Lake, with the numerical designation identifying the sample order and finally the depth at which the sample was collected will be provided.

4. For samples collected from containment area #4 the following number system shall be used:

CA-4 1 - 6"  
CA-4 1 - 18"

CA-4 will identify the sample as being derived from containment area #4, with the numerical designation identifying the sample order and the depth at which the sample was collected will be provided.

#### 3.6.1 Labeling

Sample labels will be affixed to each sample at the time of collection. The label will include the following information as a minimum:

- Sample identification number;
- Date sampled;
- Time sampled; and
- Person sampling.

In addition, each person involved in the sampling activity will record the above information, as well as comments regarding sampling, in a field log book and on the chain of custody form.

### 3.7 Sample Shipment

Each sample will be placed into individual laboratory provided glass jars. Samples will be placed carefully in coolers for storage and shipment. At least two bags of ice, sealed in double plastic bags will be placed inside to maintain samples at approximately 4 degrees C. Each cooler will be provided with a chain-of-custody form. Attachment 1 illustrates a typical chain-of-custody form.

All environmental samples for analytical testing will be hand delivered or shipped overnight to Prairie Analytical within 24 hours after sampling to allow completion of analyses within the specified holding times.

### 3.8 Decontamination Procedures

In order to minimize the potential for cross-contamination between borings, samples and equipment which may come in contact with the sample media will be decontaminated before sampling. In addition, all equipment will be decontaminated between samples. All rinse waters used for decontamination will be captured and containerized into 55 gallon drums. The rinse waters will be transported to the polish pits or containment area #2 for disposal.

Reusable non-dedicated equipment (hand auger, split spoons, scoops, etc.) will be decontaminated between each sample and before removal from the site. The decontamination procedures for all sampling equipment will be as follows:

1. Soap wash (Alconox or equivalent) in hot water solution;
2. Potable water rinse;
3. Potable water rinse; and
4. Air Dry.

The equipment used to assist in the collection of samples will be decontaminated prior to and immediately after completion of the project. The equipment will be decontaminated using a high pressure hot water wash. A decontamination pad will be constructed of plastic sheeting and lumber. All rinse waters will be collected in a 55 gallon drum and transferred into a temporary tank by a portable pump. The rinse water will be transferred to the polish pits or containment area #2 for disposal.

### 3.9 Miscellaneous

#### 3.9.1 Quality Assurance/Quality Control

Quality Assurance/Quality Control samples will include a field blank. The field equipment rinse blank sample will be collected by pouring laboratory-provided distilled/deionized water over a decontaminated split spoon or hand auger. The field blank will be analyzed for lead, cadmium and zinc.

#### 3.9.2 Air Emissions

Chemetco will minimize air emissions during the excavation of the spilled zinc oxide by keeping the zinc oxide wet. Chemetco's water truck will spray the zinc oxide material on a daily basis to ensure dust problems do not occur.

#### 3.9.3 Personnel Safety and Fire Prevention

Clean up operations are being conducted by personnel who have received 40 hours of health and safety training in compliance with OSHA, 29 CFR 1910.120(E). All managers and supervisors present have received an additional eight hours of specialized training on managing hazardous waste operations.

## 4.0 SITE INVESTIGATION REPORT

Following receipt of final analytical results, a report will be prepared summarizing the methods and results of the investigation. The report will contain information as outlined below:

- An area map will be prepared showing the general site location.
- Field and laboratory methods will be outlined and laboratory analytical results

will be reported.

- The nature and extent of any subsurface contaminants detected during the investigation will be summarized.

## 5.0 CLEAN UP OBJECTIVES

The data will be evaluated to determine if lead, cadmium and zinc values are above the Class II, Migration to Groundwater Values presented in TABLE A: Tier 1 Soil Remediation Objectives for Residential Properties as proposed in Title 35: Environmental Protection; Subtitle G: Waste Disposal; Chapter I: Pollution Control Board; Subchapter f: Risk Based Cleanup Objectives; Part 742 - Tiered Approach to Corrective Action Objectives. Class II numbers were chosen since the groundwater beneath the spill area is not located 10 feet or more below the ground surface as required for a Class I aquifer under 35 Ill. Adm. Code, Part 620, Section 620.210. Depth to groundwater beneath the spill area ranges from 3 to 7 feet. TABLE 1; Tier 1 Remediation Objectives are presented below:

CAS #	Chemical Name	Route-Specific Values for Surface Soils		Migration to Groundwater Route Values		ADL (mg/kg)
		Ingestion	Inhalation	Class I (mg/kg)	Class II (mg/kg)	
7440-43-9	Cadmium <sup>1a</sup>	78 <sup>b,c</sup>	1800 <sup>a</sup>	0.005 <sup>m</sup>	0.05 <sup>m</sup>	*
7439-92-1	Lead	400 <sup>a</sup>	---- <sup>a</sup>	0.0075 <sup>m</sup>	0.1 <sup>m</sup>	*
7440-66-6	Zinc	23,000 <sup>a</sup>	---- <sup>c</sup>	5.0 <sup>a</sup>	10.0 <sup>a</sup>	*

- \* Indicates ADL is less than or equal to the specified cleanup objective.
- <sup>c</sup> No toxicity criteria available for the route of exposure.
- <sup>k</sup> A preliminary remediation goal of 400 mg/kg has been set for lead based upon Revised Interim Soil Lead Guidance for CERLCA Sites and RCRA Corrective Action Facilities, OSWER Directive #9355.4-12.
- <sup>l</sup> Potential for soil-plant-human exposure.
- <sup>m</sup> Concentration in mg/L determined by the Toxicity Characteristic Leaching Procedure (TCLP). The person conducting the remediation has the option to use TCLP objectives listed in this Table or the applicable pH-specific soil cleanup objectives listed in Appendix, Table C or D. If the person conducting the remediation wishes to calculate soil cleanup objectives based on background concentrations, this should be done in accordance with Subpart C of 742.
- <sup>n</sup> The agency reserves the right to evaluate the potential for remaining contaminant concentrations to pose significant threats to crops, livestock, or wildlife.
- <sup>o</sup> For agrichemical facilities, cleanup objectives for surficial soils which are based on field application rates may be more appropriate for currently registered pesticides. Consult the Agency for further information.

Chemetco, Inc.  
Sampling and Analysis Plan  
Zinc Oxide Spill Area  
Page 9

If TCLP lead, cadmium and zinc values are above the Class II objectives, Chemetco retains the right to further evaluate clean up objectives using a Tier 2 or 3 evaluation, further treatment or a combination of both.

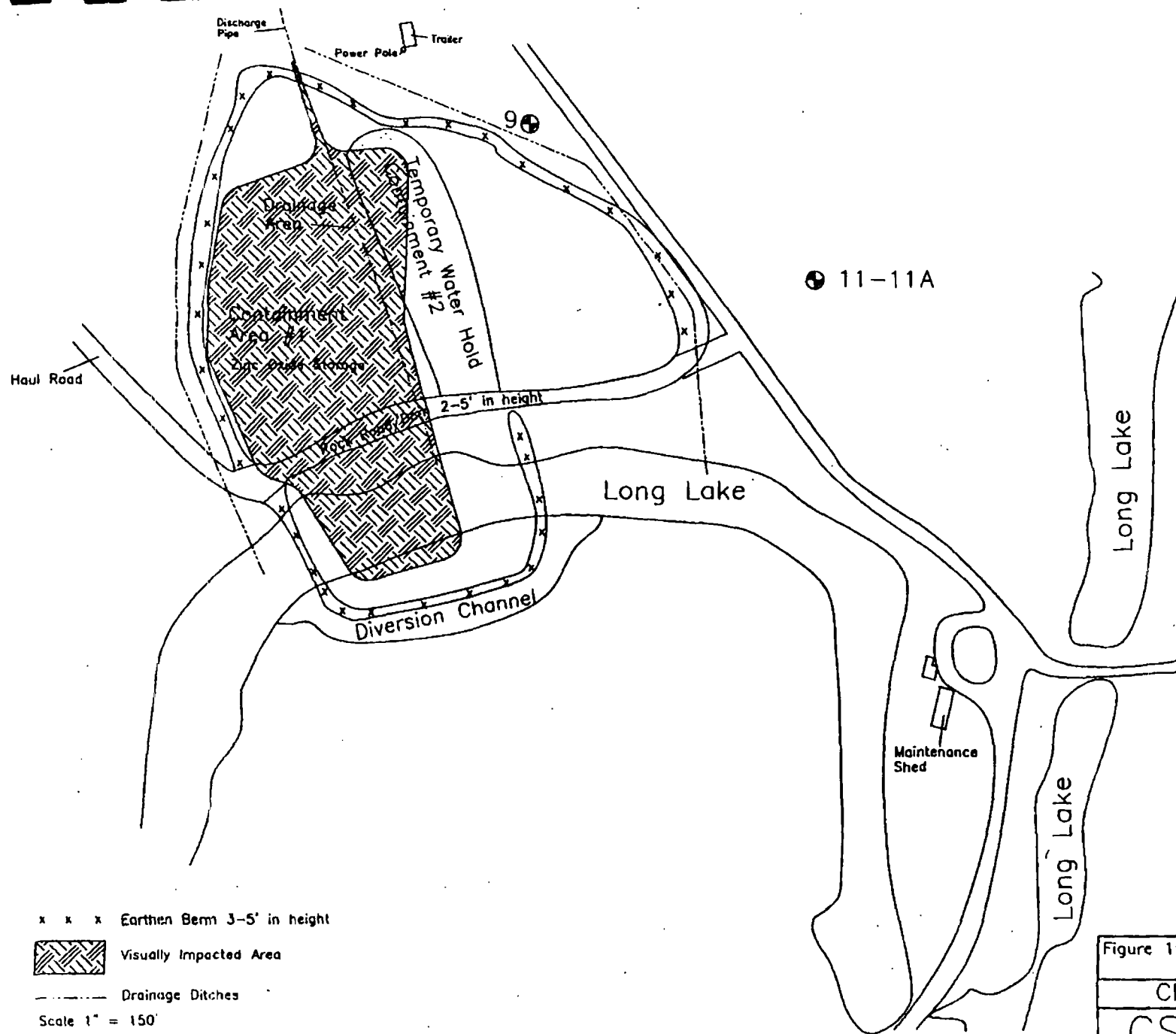


Figure 1: Location of Spill  
Area - 10/7/96

Chemetco, Inc.

CSD Environmental  
Services, Inc.

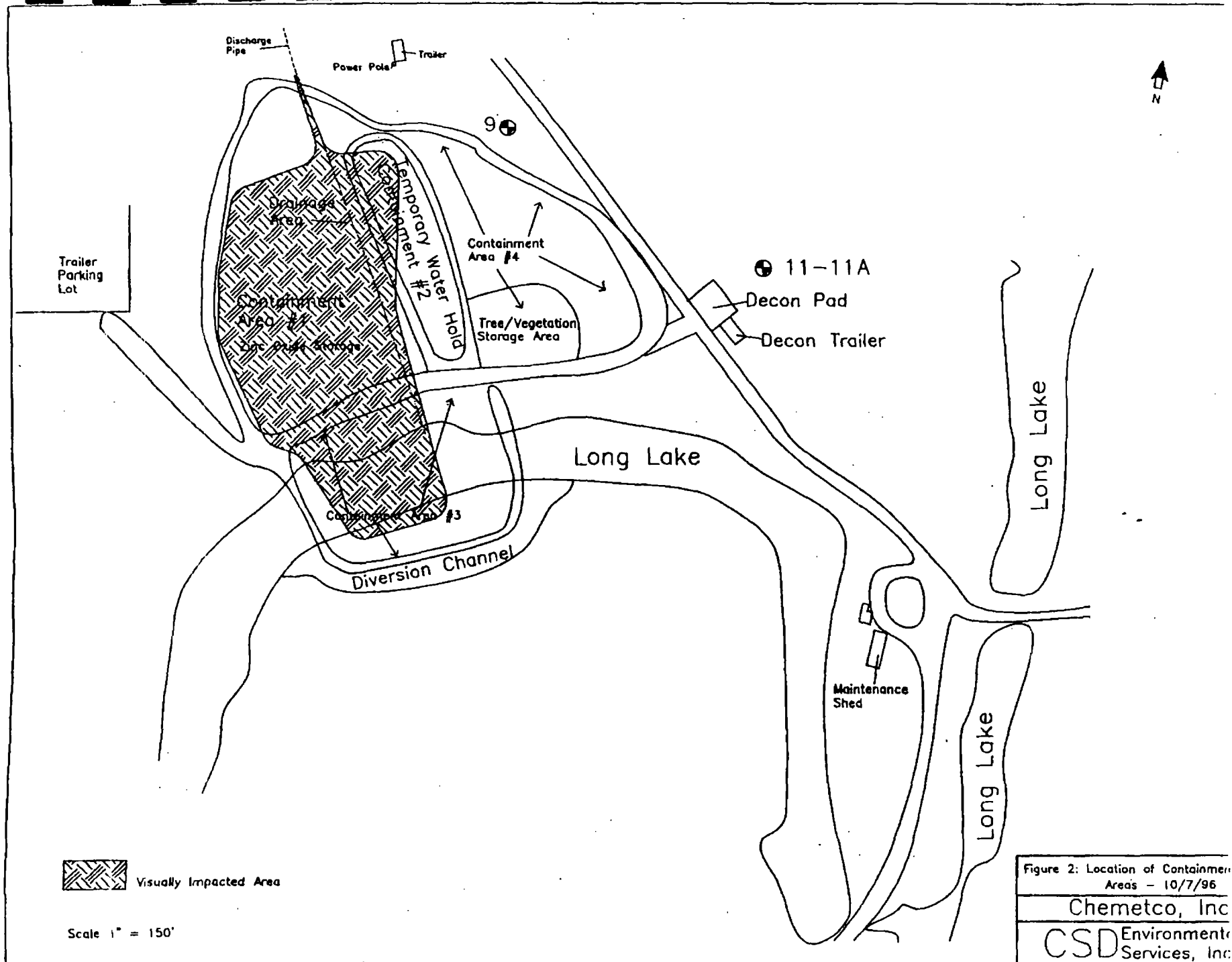


Figure 2: Location of Containment Areas - 10/7/96

Chemetco, Inc.

CSD Environmental Services, Inc.

Services, Inc.

Area	
CA #1	200 x 370 = 74,000 sq. ft.
CA #2	300 x 90 = 27,000 sq. ft.
CA #3	250 x 200 = 50,000 sq. ft.
CA #4	200 x 300 = 60,000 sq. ft.

Scale 1" = 100'



● Sample Points

▨ Visually Impacted Area

⊕ 11-11A

Decon Pad

Decon Trailer

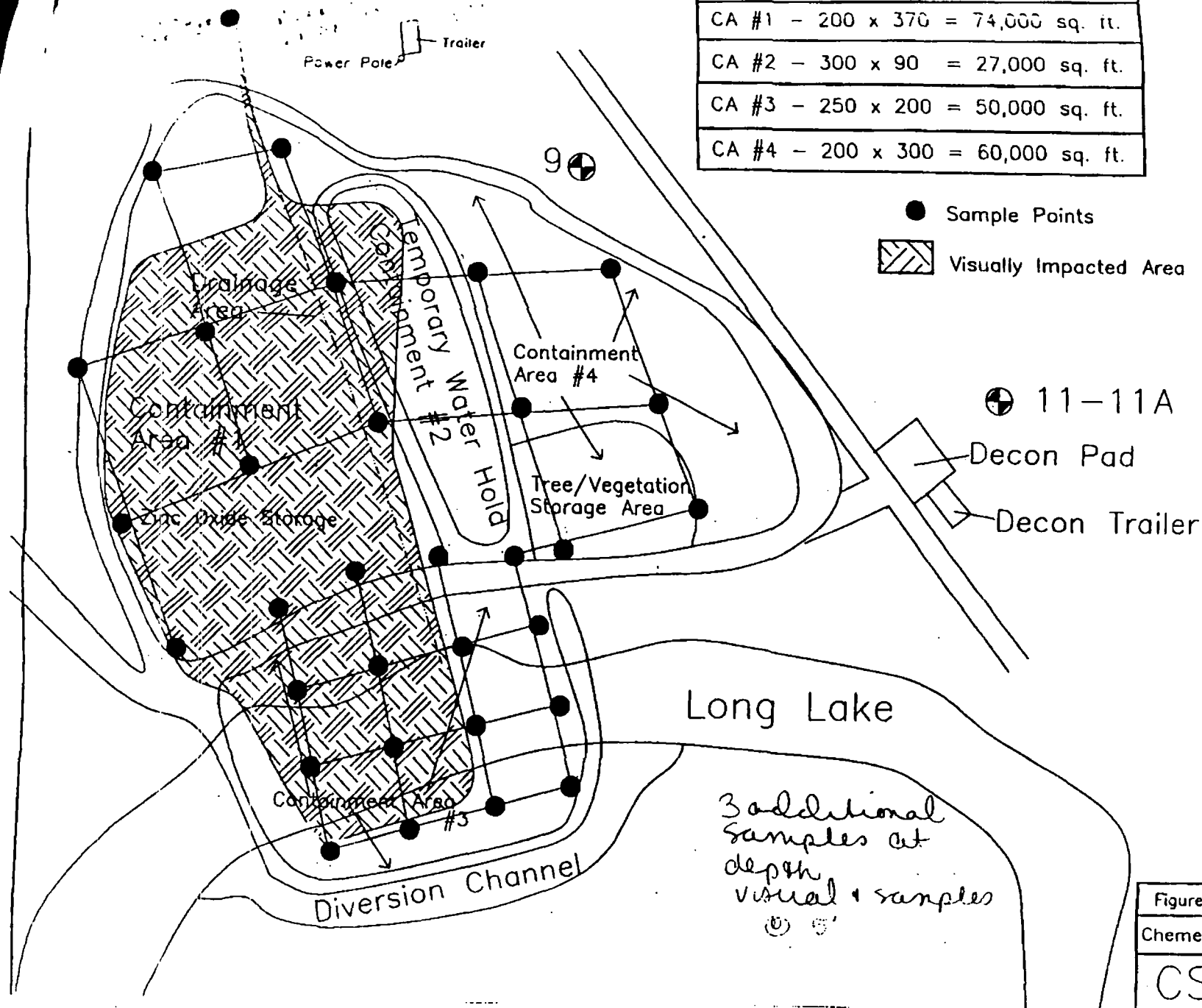
Long Lake

3 additional  
samples at  
depth  
visual + samples

Figure 3: Sample Locations

Chemetco, Inc. 10/10/96

CSD Environmental  
Services, Inc.



Page        of       [illegible]

PAS Project CODE: \_\_\_\_\_

Copies: White - Clean, Yellow - Lab Receipts, Pink - Released by Smelter

Chemetco, Inc.  
1198010003--Madison County  
Zinc Oxide Spill Remediation Plan  
April 1997

ATTACHMENT 5

Photographs



Spill Area Prior to Containment looking South



Looking Northwest



Long Lake Prior to Removal

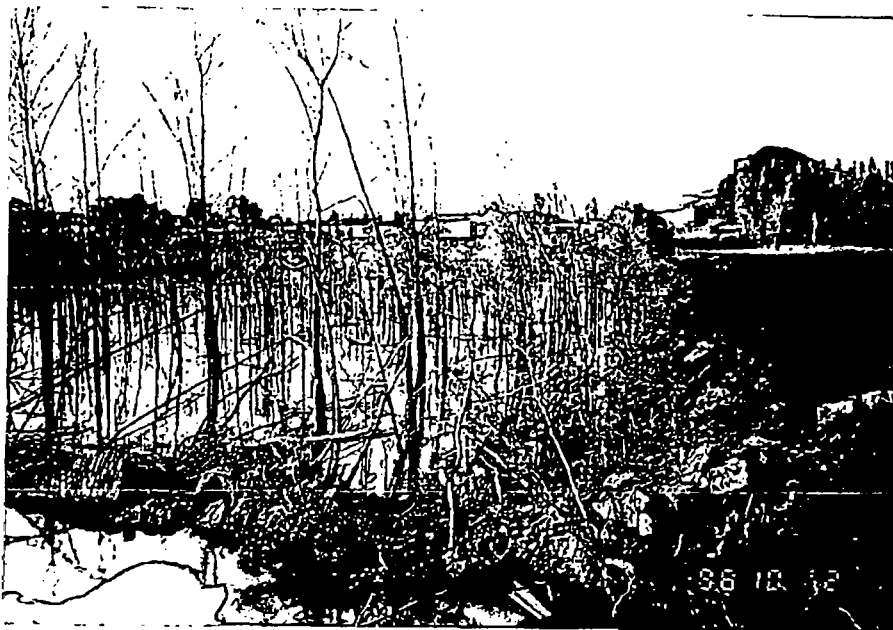




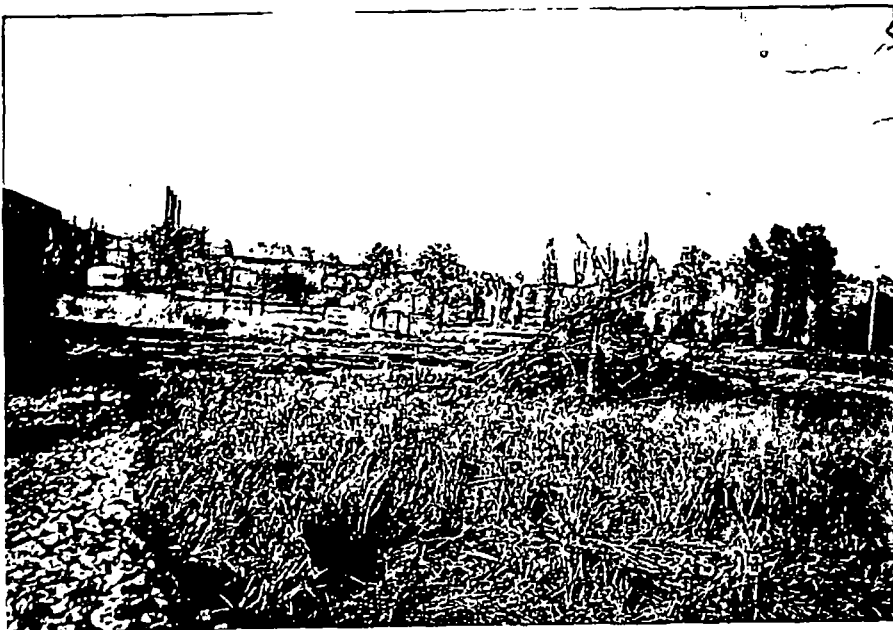
Spill Area Prior to Containment looking North



Long Lake Prior to Removal



*Containment Area #1 prior to water removal*



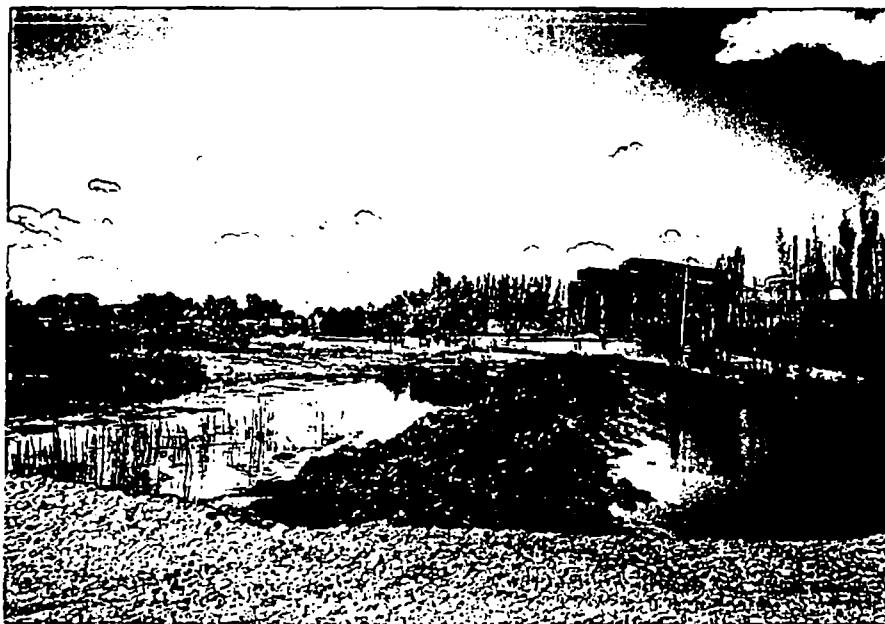
*Vegetation Stockpile*



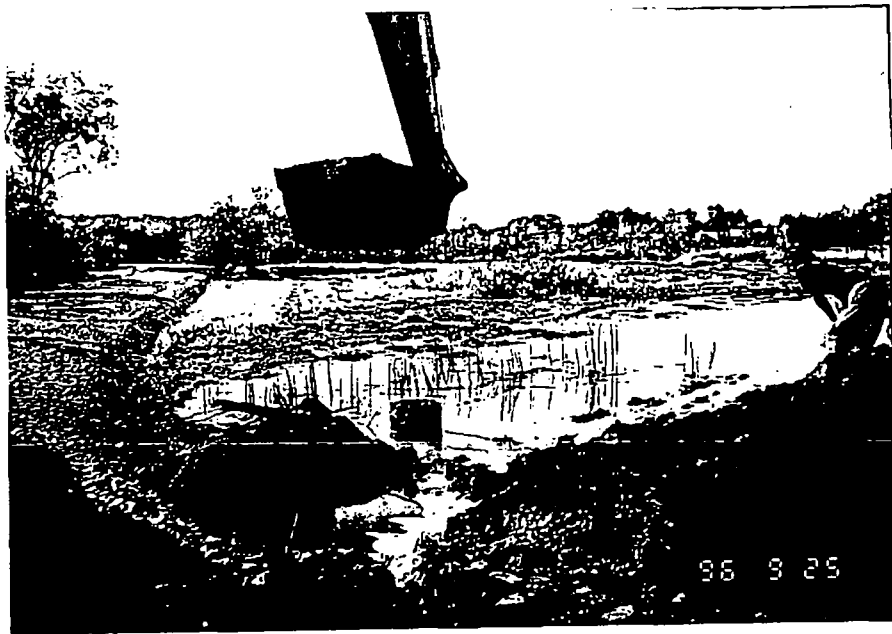
Diversion Channel along Long Lake



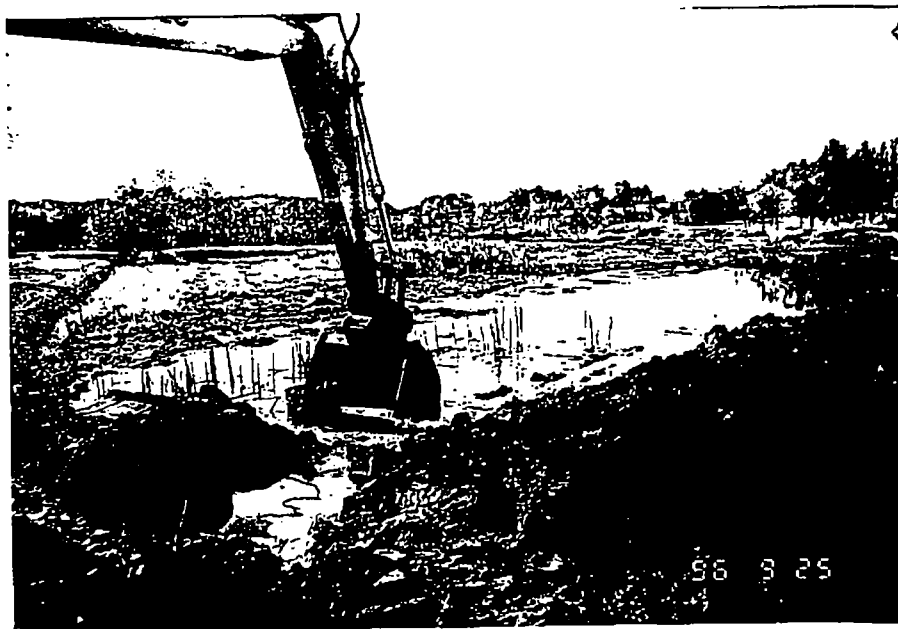
Construction of decontamination pad

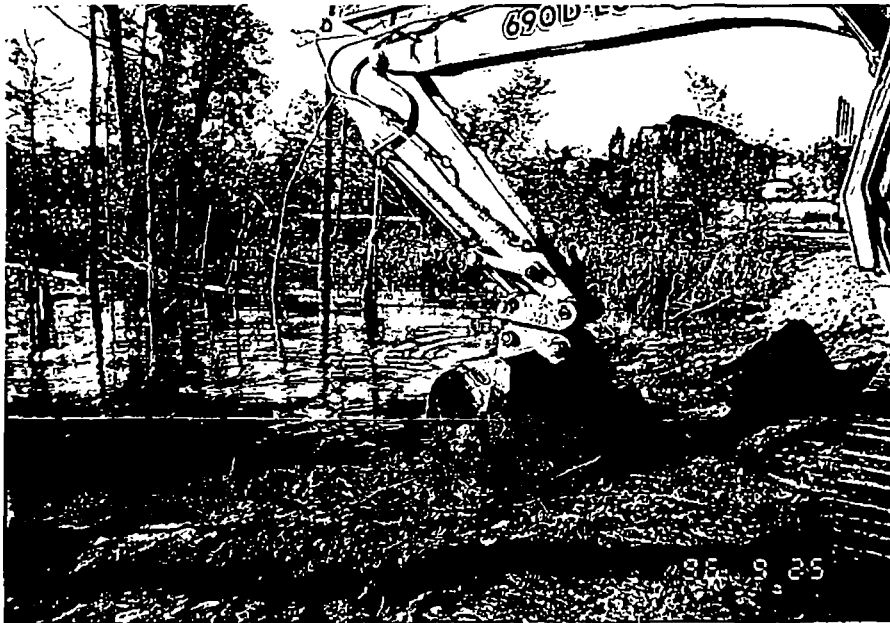


Construction of east berm (Containment Area #4)



Excavating hole for insertion of 55 gallon drum for water removal





Excavating hole for insertion of 55 gallon drum for water removal



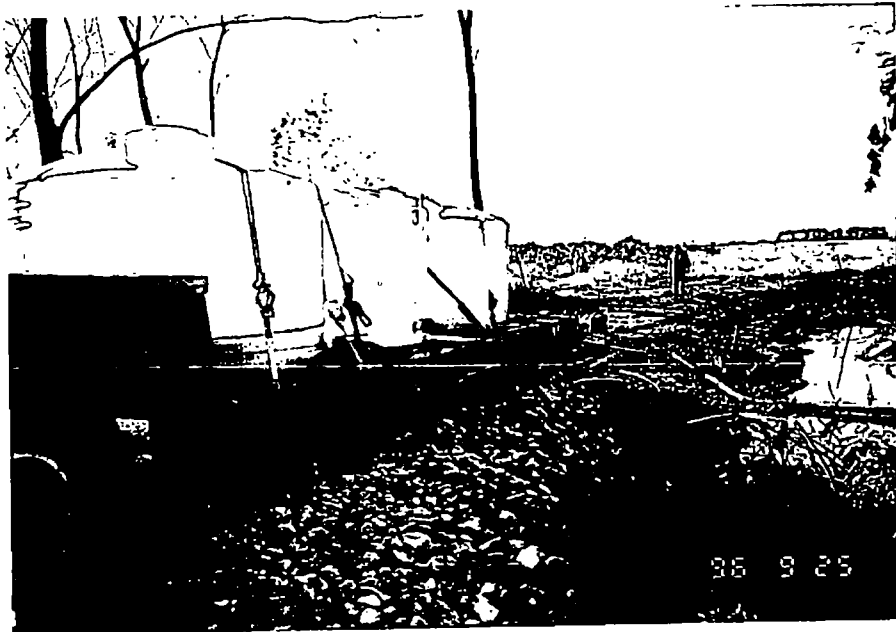
Decontamination pad and job trailer



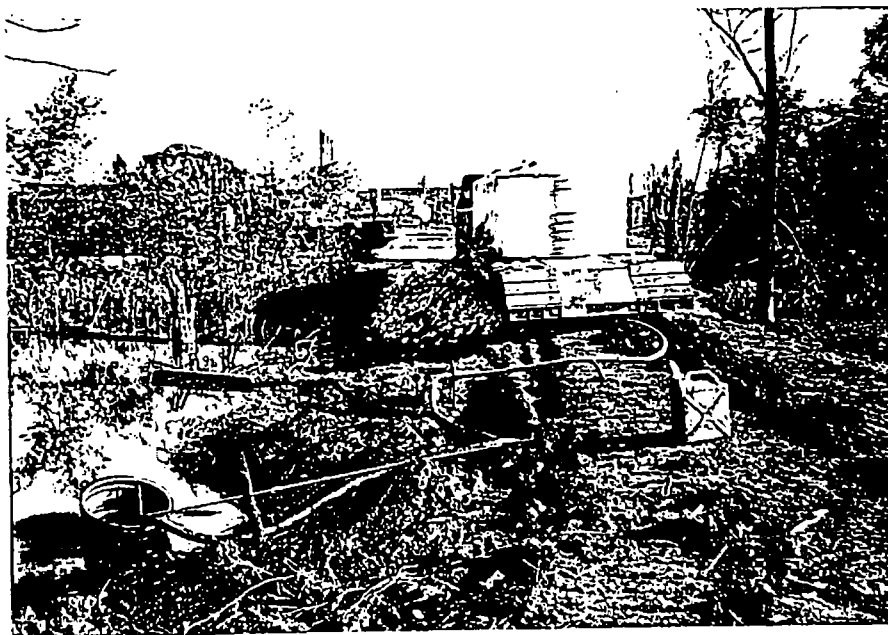
Emptying of load of water from Long Lake



Construction of rock road/dam



Removal of water from Long Lake





Zinc oxide and temporary construction pads in Long Lake facing south



Containment Area #1 looking southeast to northwest

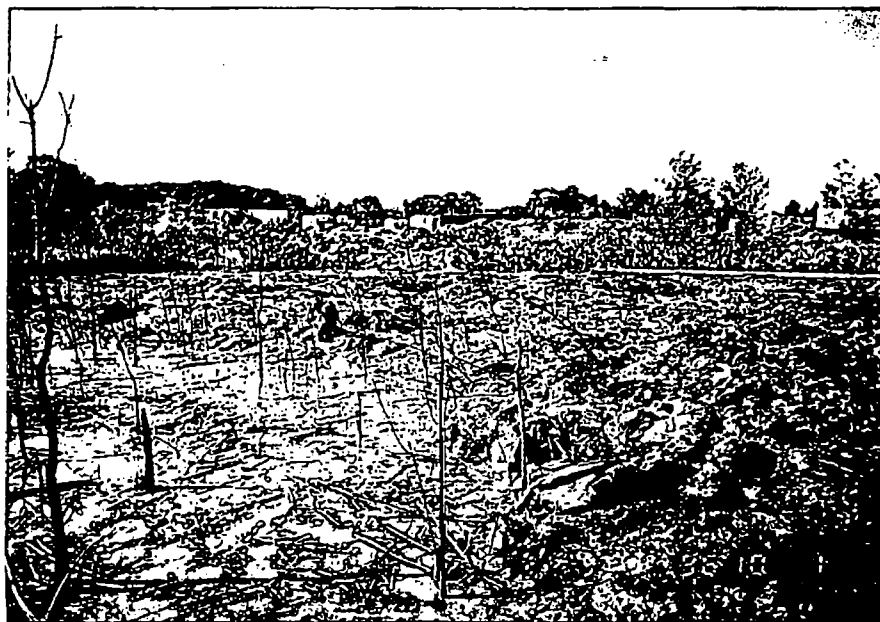


Removal of trees from Long Lake





Spill Area looking east to west



Zinc Oxide



Zinc oxide spill area looking west to east



Pushing zinc oxide from east edge of the spill towards Containment Area #1 to construct Containment Area #2

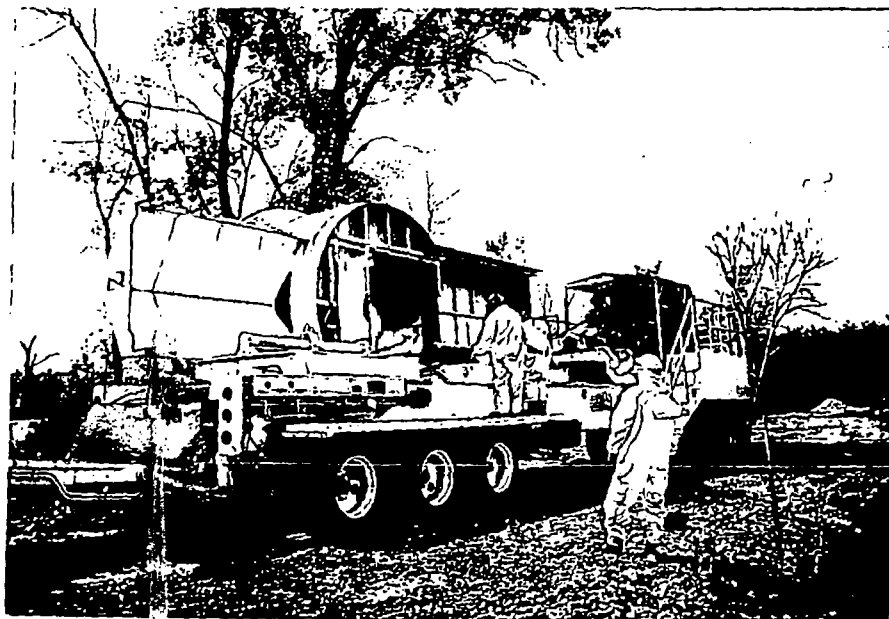


Pushing zinc oxide from east edge of the spill towards Containment Area #1





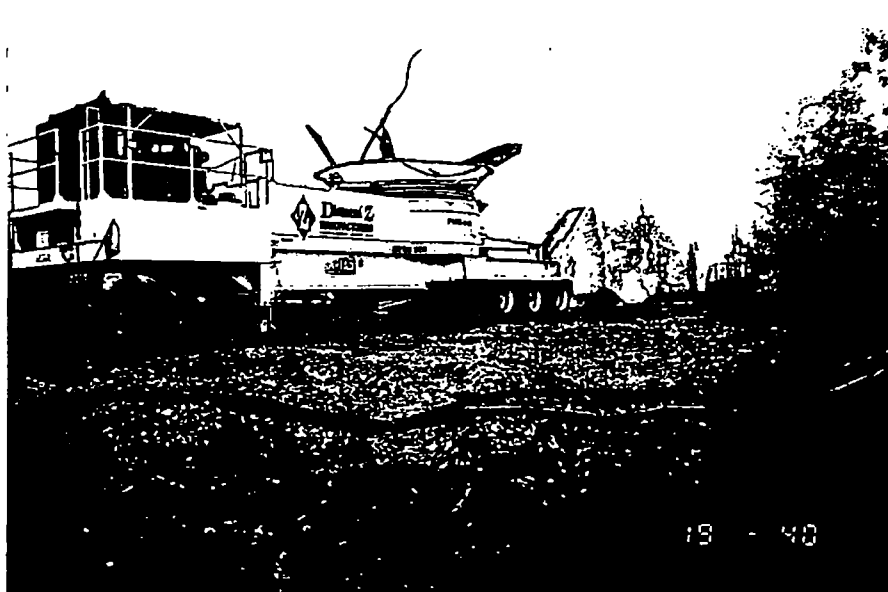
Containment Area #2

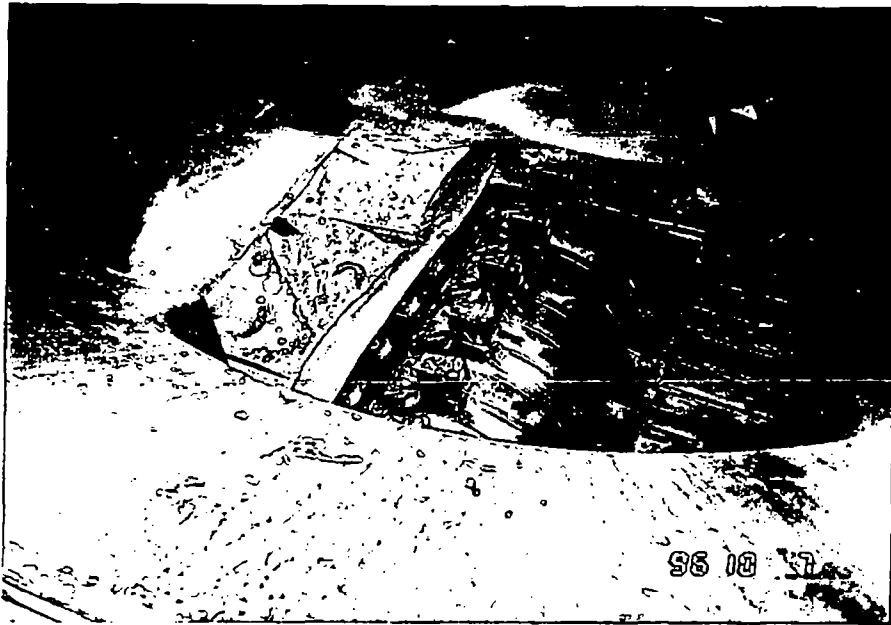


Delivery of shredder



Shredding of trees

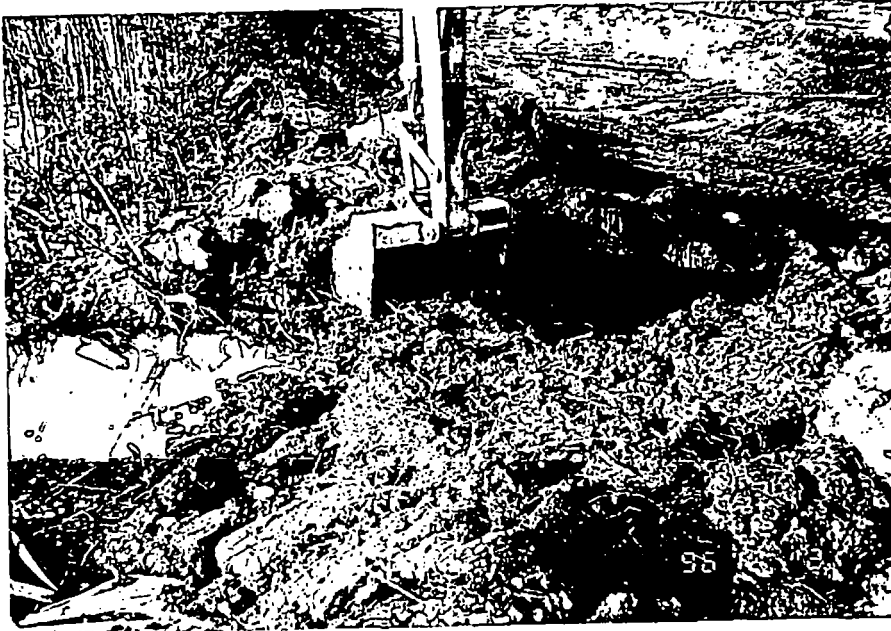




Inside shredder



Soil Removed from Containment Area #3



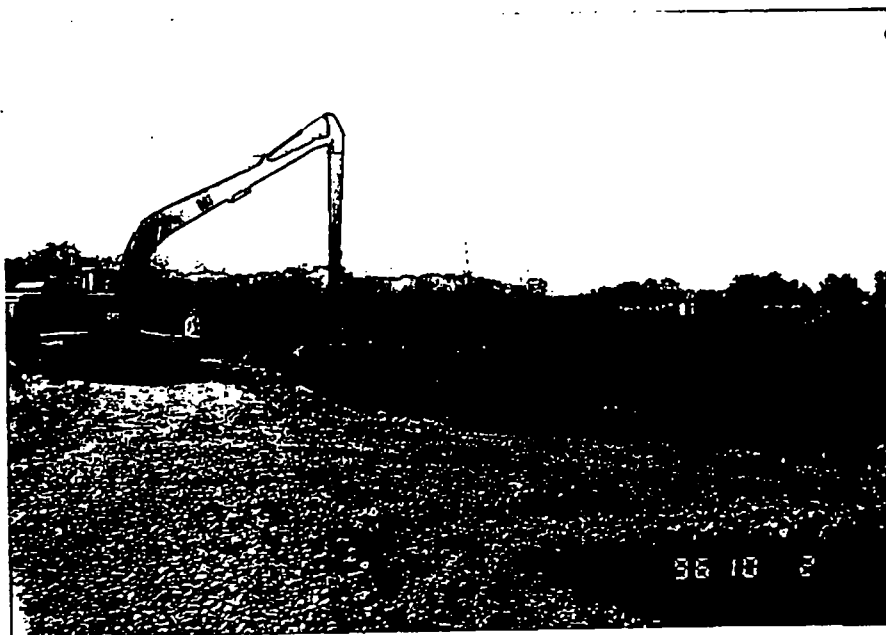
Removal of zinc oxide in ditch between Containment Areas 1 and 2



Removal of zinc oxide in ditch between Containment Areas 1 and 2

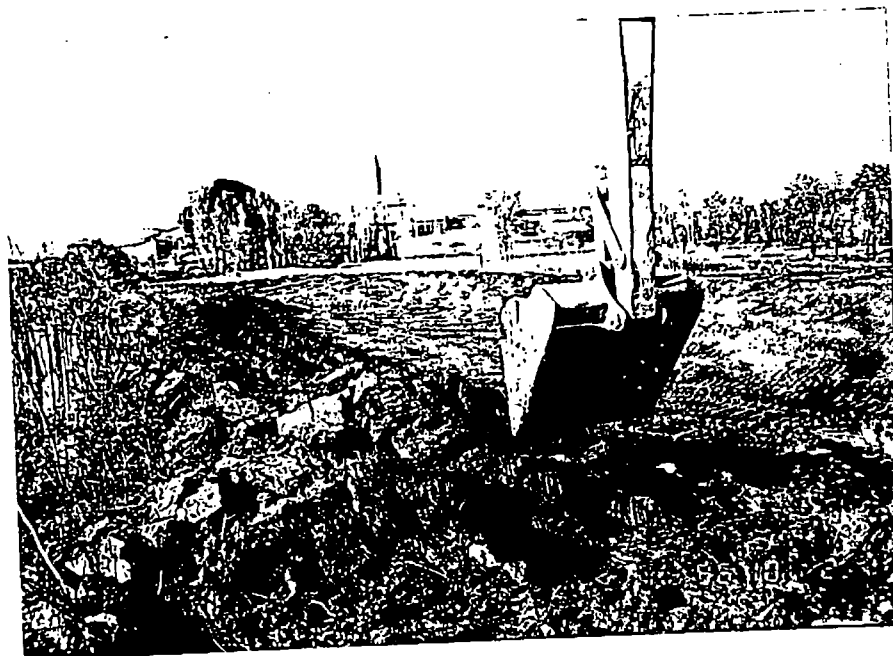


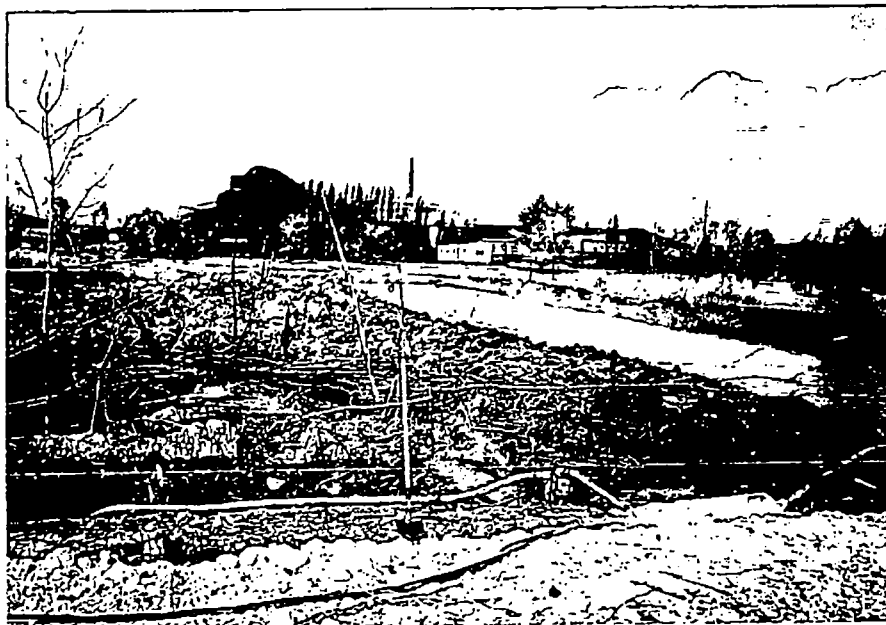
Construction of Containment Area #2





Construction of Containment Area #2





Containment Area #2 looking to the north towards the plant



Zinc Oxide - Containment Area #1 looking to north towards plant



Removal of zinc oxide from Long Lake



Zinc oxide in Long Lake after trees were removed. Looking to the north towards the plant.



Containment Area #1



Removal of Rock Pads in Containment Area #3



Final Soil Removal in Containment Area #3





Final Soil Removal in Containment Area #3

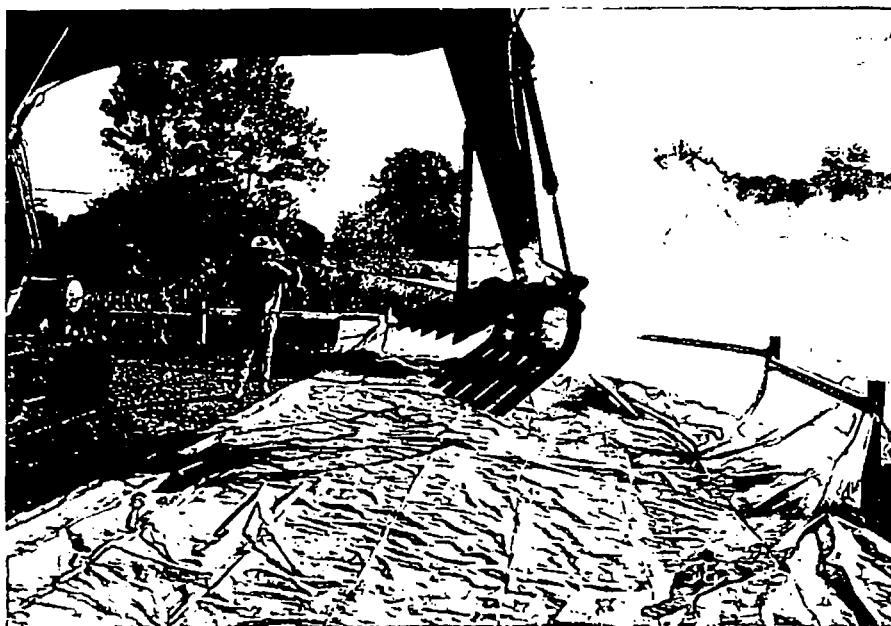




Zinc Oxide

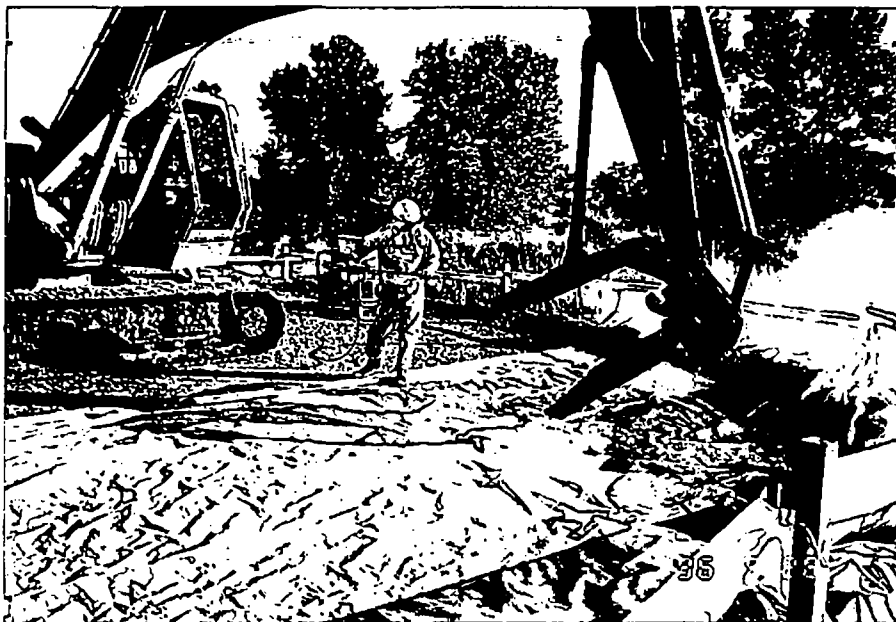


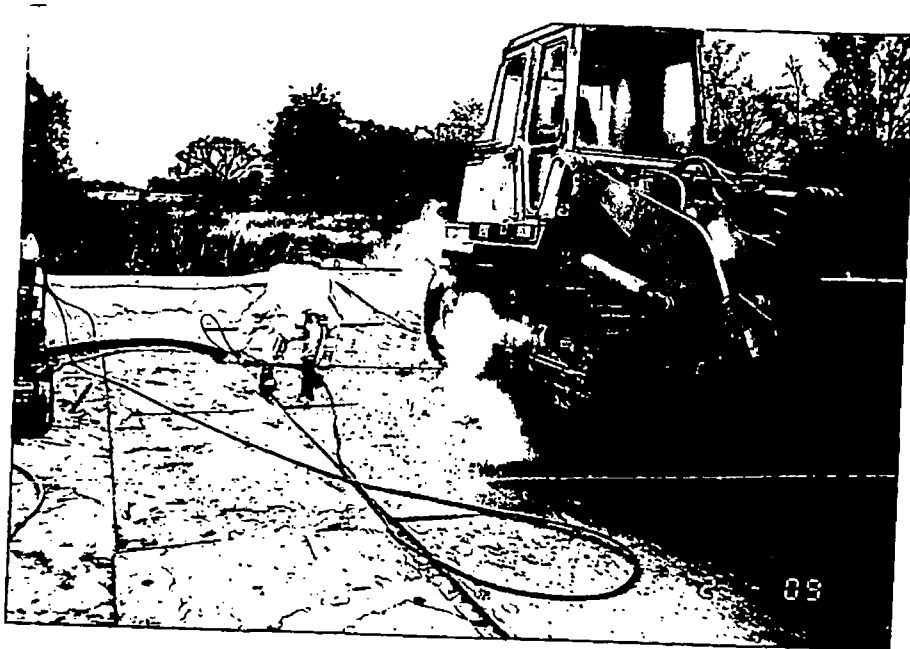
Decontamination of equipment used to remove trees





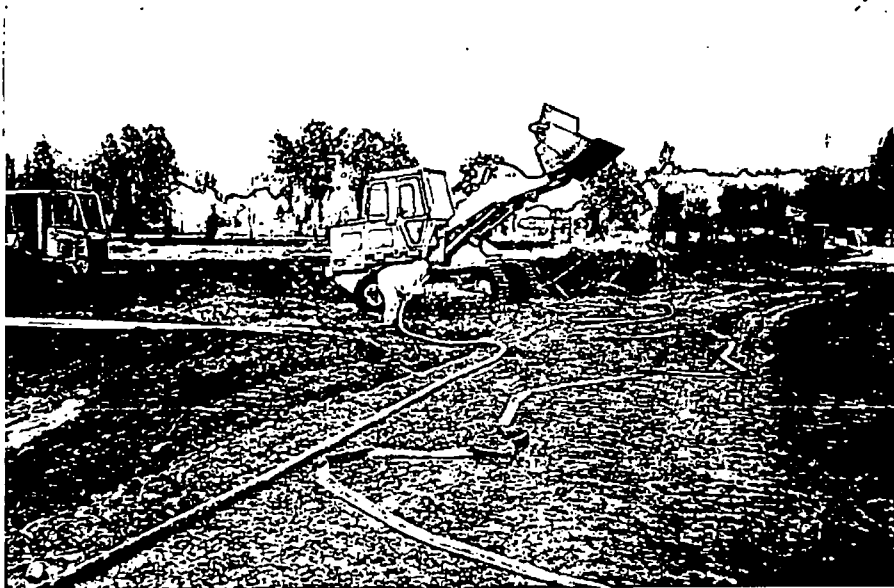
Decontamination





Decontamination of dozer





Decontamination of bulldozer

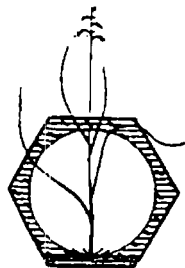


Long Lake looking to the west

Chemetco, Inc.  
1198010003—Madison County  
Zinc Oxide Spill Remediation Plan  
April 1997

**ATTACHMENT 6**

**Analytical Results from Containment Areas 3 and 4**



# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 24 October 1996  
Date Received: 25 October 1996  
Date Analyzed: 31 October 1996  
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:  
PAS Sample No.:

CA3-1-6    CA3-1-18    CA3-2-6  
9610254568    9610254569    9610254570

## TCLP Metal Analysis

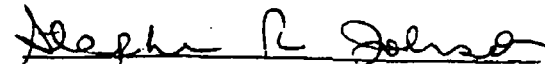
Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.013	<0.001	<0.001	7131A
Lead	0.001	0.012	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

Sample Description:  
PAS Sample No.:

CA3-2-18    CA3-3-6    CA3-3-18  
9610254571    9610254572    9610254573

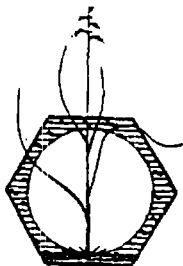
## TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	<0.001	0.005	0.007	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148





# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 24 October 1996  
Date Received: 25 October 1996  
Date Analyzed: 31 October 1996  
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:  
PAS Sample No.:

CA3-4-6 CA3-4-18 CA3-5-6  
9610254574 9610254575 9610254576

## TCLP Metal Analysis

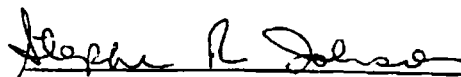
Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.007	0.005	0.010	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

Sample Description:  
PAS Sample No.:

CA3-5-18 CA3-6-6 CA3-6-18  
9610254577 9610254578 9610254579

## TCLP Metal Analysis

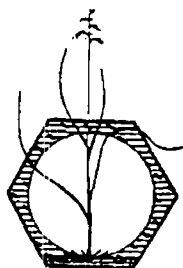
Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.006	0.066	0.061	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	0.04	<0.002	6010A

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-TCLPM





# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 24 October 1996  
Date Received: 25 October 1996  
Date Analyzed: 31 October 1996  
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:  
PAS Sample No.:

CA3-7-6    CA3-7-18    CA3-8-6  
9610254580    9610254581    9610254582

## TCLP Metal Analysis

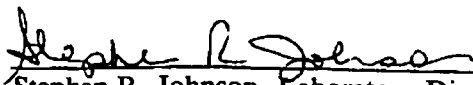
Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.48	0.009	0.010	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	8.1	0.21	<0.002	6010A

Sample Description:  
PAS Sample No.:

CA3-8-18    CA3-9-6    CA3-9-18  
9610254583    9610254584    9610254585

## TCLP Metal Analysis

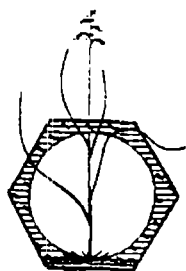
Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.010	0.029	0.047	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	0.24	0.70	<0.002	6010A

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-TCLPM





# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 24 October 1996  
Date Received: 25 October 1996  
Date Analyzed: 31 October 1996  
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:  
PAS Sample No.:

CA3-3-5      CA3-4-5      CA3-4-26  
9610254586   9610254587   9610254588

## TCLP Metal Analysis

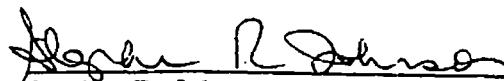
Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.020	0.007	0.008	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

Sample Description:  
PAS Sample No.:

CA3-7-5      ---      ---  
9610254589      ---      ---

## TCLP Metal Analysis

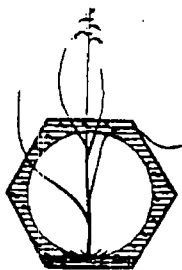
Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.106	---	---	7131A
Lead	0.001	<0.001	---	---	7421
Zinc	0.002	1.32	---	---	6010A

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-TCLPM





# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 23 October 1996  
Date Received: 25 October 1996  
Date Analyzed: 31 October 1996  
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:  
PAS Sample No.:

CA4-1(6") CA4-1(18") CA4-2(6")  
9610254590 9610254591 9610254592

## TCLP Metal Analysis

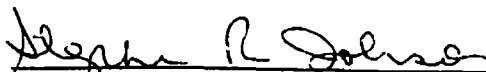
Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.018	<0.001	0.048	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	0.53	6010A

Sample Description:  
PAS Sample No.:

CA4-2(18") CA4-3(6") CA4-3(18")  
9610254593 9610254594 9610254595

## TCLP Metal Analysis

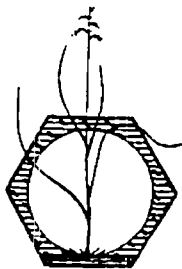
Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.014	<0.001	0.005	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	0.16	6010A

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-TCLPM





# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 23 October 1996  
Date Received: 25 October 1996  
Date Analyzed: 31 October 1996  
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-126

Sample Description:  
PAS Sample No.:

CA4-4(6") CA4-4(18") CA4-5(6")  
9610254596 9610254597 9610254598

## TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.053	0.107	<0.001	7131A
Lead	0.001	0.472	0.047	<0.001	7421
Zinc	0.002	11.7	3.97	<0.002	6010A

Sample Description:  
PAS Sample No.:

CA4-5(18") CA4-9(6") CA4-9(18")  
9610254599 9610254600 9610254601

## TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	Result mg/l	Result mg/l	E.P.A. Method
Cadmium	0.001	0.032	0.014	<0.001	7131A
Lead	0.001	<0.001	<0.001	<0.001	7421
Zinc	0.002	<0.002	<0.002	<0.002	6010A

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

Form PAS-RWMETAL



# Chain of Custody Record

Page \_\_\_ of \_\_\_

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental	Project	Chemetics
Address	2220 Yale	Contact Person	ASD
City, State, Zip	Springfield, IL	P. O. #/ Invoice to:	ASD
Phone Number	217-522-4085	Facsimile Number	

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
CA3-7-16	Soil	10/24	AM	4oz		none	ICP <del>As</del> , Cd, Pb & Zinc	4580
CA3-7-18							Detection limit of 0.0075 mg/L needed for lead.	4581
CA3-8-16								4582
CA3-8-18								4583
CA3-9-16								4584
CA3-9-18								4585
CA3-3-5'								4586
CA3-4-5								4587
CA3-4-24	26							4588
CA3-7-5	✓	✓		✓		✓		4589

ASD  
10/25/96  
9:50  
am

Relinquished by: <u>Mar Shinn</u>		Received by: <u>Sarah A. Fuchs</u>	
Date: <u>10/25/96</u>	Time: <u>9:25</u>	Date: <u>10/25/96</u>	Time: <u>9:25 am</u>
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-126

# Chain of Custody Record

Page \_\_\_ of \_\_\_

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD Environmental	Project	Chemetco
Address	2220 Yale Boulevard	Contact Person	C. DAVIS
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	CSD
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
CA3-1-6	Soil	10/24	AM	4oz		NONE	TELE LEAD, CAD, & ZINC.	4568
CA3-1-18							Need detection limit on	4569
CA3-2-6							Lead of 0.0075 mg/l	4570
CA3-2-18								4571
CA3-3-6								4572
CA3-3-18								4573
CA3-4-6								4574
CA3-4-18								4575
CA3-5-6								4576
CA3-5-18								4577
CA3-6-6								4578
CA3-6-18								4579

Relinquished by: <i>Man Shum</i>	Received by: <i>Sarah A. Fultz</i>
Date: <i>10/25/96</i>	Date: <i>10/25/96</i>
Time: <i>9:25</i>	Time: <i>9:25am</i>
Relinquished by:	Received by:
Date:	Date:
Time:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: *CSD-126*

# Chain of Custody Record

Page \_\_\_ of \_\_\_

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD ENVIRONMENTAL INC	Project	CHEMETCO
Address	2220 YALE	Contact Person	M. SIMMERING / Cindy Davis
City, State, Zip	SPRINGFIELD IL 62703	P. O. #/ Invoice to:	CSD ENV. INC.
Phone Number	522-4045	Facsimile Number	522-4047

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
CA4-1 (6")	Soil	10/23	P.M.	4oz	1	None	TEP Lead, Cad & Zinc.	4590
CA4-1 (18")							Need Detection Limit of	4591
CA4-2 (6")							0.0075 mg/L on Lead	4592
CA4-2 (18")								4593
CA4-3 (6")								4594
CA4-3 (18")								4595
CA4-4 (6")								4596
CA4-4 (18")								4597
CA4-5 (6")								4598
CA4-5 (18")								4599
CA4-6 (6")								4600
CA4-6 (18")								4601

Relinquished by: M/acc. <i>Simmering</i>		Received by: <i>Sarah A. Fultz</i>	
Date: 10/24/96	Time: 9:30 A.M.	Date: 10/25/96	Time: 9:30 am
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-120

Chemetco, Inc.  
1198010003—Madison County  
Zinc Oxide Spill Remediation Plan  
April 1997

**ATTACHMENT 7**

Variance Request to IEPA, Bureau of Water

# CSD Environmental Services, Inc.

November 27, 1996

Illinois Environmental Protection Agency  
Bureau of Water #19  
2200 Churchill Road  
P.O. Box 19276  
Springfield, IL 62794-9276

Attention: Mr. Roger Callaway

RE: NPDES # IL0025747  
Chemetco, Inc.  
Emergency Discharge

Dear Mr. Callaway:

CSD Environmental Services, Inc. (CSD) on behalf of Chemetco Inc. (Chemetco) is seeking approval from the Illinois Environmental Protection Agency (Agency) for an Emergency Discharge of approximately 1.2 million gallons (MG) of water into Long Lake under Chemetco's existing NPDES permit. An explanation of how the water was generated is provided below.

On September 17, 1996, Chemetco discovered a stormwater discharge occurring on the south portion of their plant from a former stormwater discharge pipe which was thought to have been disconnected. Refer to Figure 1 for the location of the spill area. The stormwater discharge contained zinc oxide material and some of the discharge reached Long Lake. To remove the zinc oxide from Long Lake a permit was granted by the U.S. Army Corp of Engineers to construct two dams and a diversion channel. After the dams and diversion channel were constructed, the water contained in the affected portion of Long Lake was pumped into Containment Area #2 for holding.

Figure 1 shows the location of the dams, diversions and containment areas. Containment Area #2 contains approximately 1.2 MG gallons of water. A sample was collected from the water in Containment Area #2 and analyzed for the NPDES discharge parameters specified in Chemetco's NPDES permit. Table 1 provides a summary of the sample results and a comparison to the General Use Standards as defined in 35 Ill. Adm. Code, Subtitle C, Part 304. Exceedences of the General Use Standards were found for cadmium, copper, iron, manganese, lead, suspended solids, and zinc. CSD previously verbally requested an emergency discharge permit the week of October 21. Based on these initial results you indicated, the Bureau of Water (BOW) would not grant discharge of the water without some type of treatment. In response, CSD collected an additional sample of the water and requested the laboratory to analyze for dissolved metals. Table 2 provides a summary of the sample results and a comparison to the General Use Standards. After filtering, only cadmium, manganese and suspended solids were detected above the General Use Standards.



2220 Yale Blvd., Springfield, IL 62703 • Phone 217-522-4085 • FAX 217-522-4087



It appears the majority of the constituents of concern can be removed by filtering. Chemetco proposes to treat the water by filtration prior to discharge into Long Lake. Chemetco's NPDES permit allows discharge of stormwater into Long Lake, however, no discharge standards are provided for in the permit. Chemetco is requesting an emergency discharge permit since Containment Area #2 is at capacity and we are fearful any additional rainfall will result in an unpermitted discharge. As part of the emergency permit we are requesting a temporary waiver of the Class K operator requirements. Once Containment Area #2 is emptied, no further discharge under the emergency permit is anticipated. Containment Area #2 can contain the resulting runoff from a one-time storm of approximately 19" over the spill area. Chemetco intends to apply for a major modification of their existing NPDES permit to allow additional discharges as necessary during completion of remediation. CSD will apply for a Class K license to operate the filtration unit. We are requesting permission under an emergency situation only as a bridge until the major modification of the existing permit is granted.

We are requesting the Agency's assistance in helping us find the best option for discharge of this water. This area is not serviced by sanitary or storm sewers and trucking 1.2 MG to a treatment plant does not appear to be feasible. I will be contacting you within the next 10 days to arrange a meeting between Chemetco, CSD and the Agency to discuss this issue and any options which may be available. If you have any questions before then please feel free to contact me at the number below.

Sincerely,

Cindy S. Davis  
President

**Table 1**  
**Water Sample Result from Containment Area #2**  
**Collected on October 11, 1996**  
**Analyzed for NPDES Discharge Parameters**  
**Total Metals**

Parameter	Result in mg/l	General Use Standard
Silver	0.021	0.1
Boron	5.54	*
BOD	<7.5	30
Cadmium	0.563	0.15
Chlorine	<0.05	*
Copper	1.20	0.5
Iron	2.57	2.0
Hexane soluble Oil and Grease	11.5	15.0
Manganese	2.42	1.0
Nickel	0.14	1.0
Lead	1.59	0.2
Suspended Solids	67	15.0
Zinc	6.63	1.0

Those samples exceeding the General Use Standard as defined in 35 Ill. Adm. Code, Subtitle C, Part 304 are highlighted.

\* No standard has been established in 35 Ill. Adm. Code, Subtitle C, Section 304.

TEST RESULTS REPORT  
FOR CHEMETCO

LOG NUMBER	SAMPLE DESCRIPTION	RESULTS OF ANALYSIS	UNITS OF MEASURE
1817010	#1 South - Containment Area # 2 SAMPLE DATE: 10/11/96		
	Total Metals Prep/ICP	10/24/96	
	Total Metals Prep/Microwave	10/16/96	
	Silver	0.021	mg Ag/l
	Boron	5.54	mg B/l
	B.O.D. (5-day)	< 7.5	mg/l
	Cadmium	0.563	mg Cd/l
	Chlorine	< 0.05	mg Cl/l
	Copper	1.20	mg Cu/l
	Iron	2.57	mg Fe/l
	Hexane soluble Oil and Grease	11.5	mg/l
	Manganese	2.42	mg Mn/l
	Nickel	0.14	mg Ni/l
	Lead	1.59	mg Pb/l
	Suspended Solids	67	mg/l
	Zinc	6.63	mg Zn/l
1817404	Long Lake-1 SAMPLE DATE: 10/17/96		
	Total Metals Prep/Microwave	10/21/96	
	Iron	29.5	mg Fe/l

**Table 2**  
**Water Sample Result from Containment Area #2**  
**Collected on October 28, 1996**  
**Analyzed for NPDES Discharge Parameters**  
**Dissolved Metal Analysis**

Parameter	Result in mg/l	General Use Standard
Cadmium, diss	0.22	0.15
Copper, diss	0.136	0.5
Iron, diss	<0.007	2.0
Lead, diss	0.010	0.2
Manganese, diss	2.14	1.0
Zinc, diss	0.68	1.0
Total Suspended Solids	23	15
pH	8.53	6 - 9

Those samples exceeding the General Use Standard as defined in 35 Ill. Adm. Code, Subtitle C, Part 304 are highlighted.

# Chain of Custody Record

Page \_\_\_ of \_\_\_

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

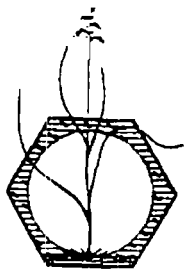
Client	<del>62000000</del> CSD ENV.	Project	Chemetox
Address	2220 Yale Blvd	Contact Person	M. SIMMERING / Cindy
City, State, Zip	Springfield, IL 62703	P. O. #/ Invoice to:	CSD ENV.
Phone Number	217/522-4085	Facsimile Number	217/522-4087

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
CA-2-water	water	10/28	AM	200	2	None	Cd, Fe, Pb, Zn, Cu, Manganese Suspended Solids - Dissolved <del>metals</del> PH	4647

Relinquished by: <i>M. Simmering</i>		Received by: <i>James R. Johnson</i>	
Date: 10/29/96	Time: 12:30	Date: 27 Oct 96	Time: 1330 hrs.
Relinquished by:		Received by:	
Date:	Time:	Date:	Time:

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-127



# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 28 October 1996  
Date Received: 29 October 1996  
Date Analyzed: 01 November 1996  
Date Reported: 01 November 1996

Project: Chemetco

PAS Project Code: CSD-127

Sample Description: CA-2-W


PAS Sample No.: 9610294647

## Metal Analysis

Analytes	Detection Limit mg/l	Result mg/l	E.P.A. Method
Cadmium, Dissolved	0.004	0.22	6010A
Copper, Dissolved	0.001	0.136	7211
Iron, Dissolved	0.007	<0.007	6010A
Lead, Dissolved	0.001	0.010	7421
Manganese, Dissolved	0.002	2.14	6010A
Zinc, Dissolved	0.002	0.68	6010A

## Miscellaneous Analysis

Analytes	Detection Limit mg/l	Result mg/l	E.P.A. Method
Total Suspended Solids	1	23	160.2
pH (units)	---	8.53	150.1

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148

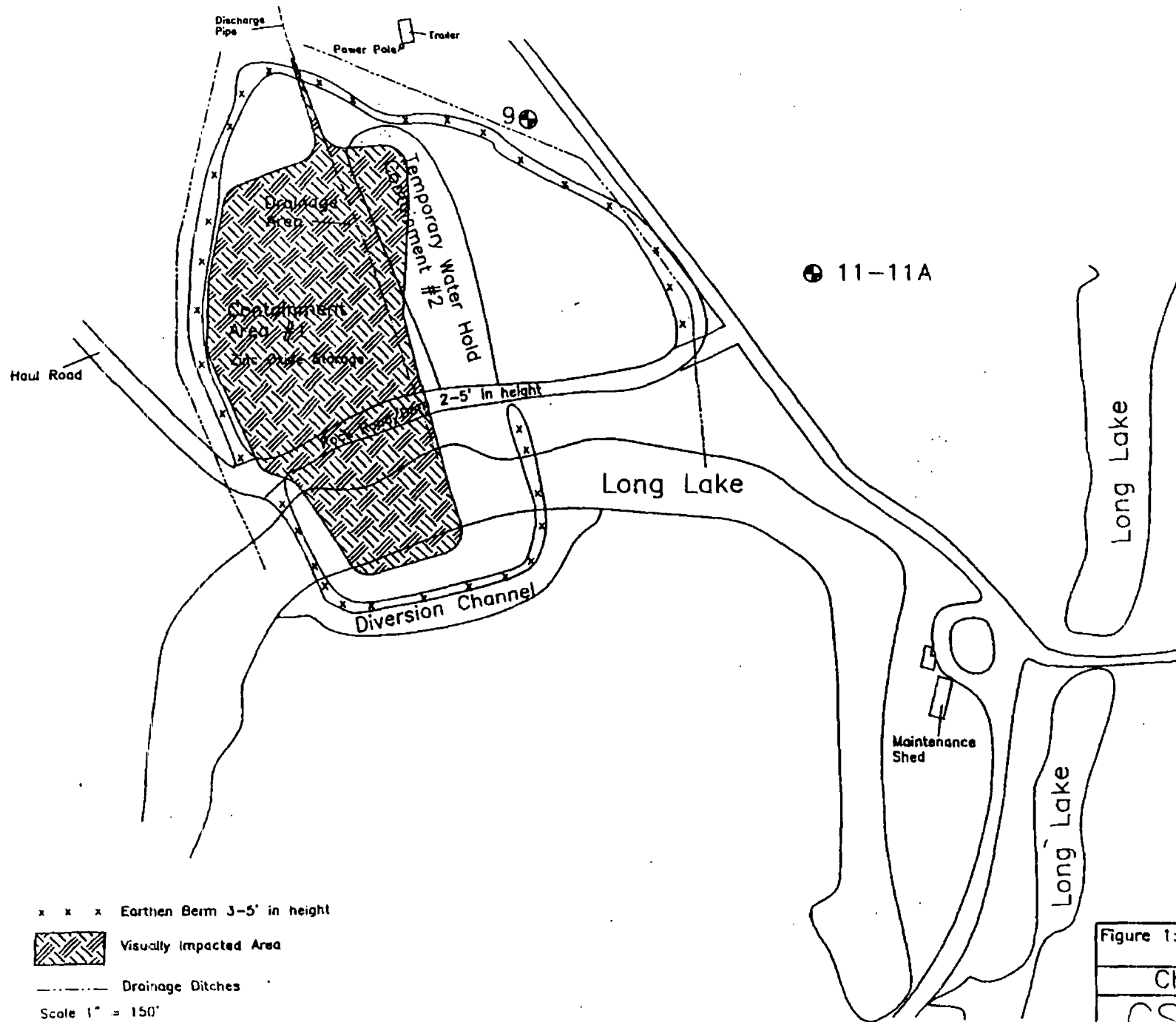


Figure 1: Location of Spill Area - 10/7/96  
Chemetco, Inc.  
CSD Environmental Services, Inc.



State of Illinois

**ENVIRONMENTAL PROTECTION AGENCY**

2200 Church Hill Road, Springfield, Illinois 62794-9276

Mary A. Gade, Director

(217) 782-9720

**CERTIFIED MAIL-RETURN RECEIPT REQUESTED**

December 6, 1996

Cindy S. Davis, President  
CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, Illinois 62703

Re: Provisional Variance Request-Chemetco, Inc.-NPDES Permit No. IL0025747

Dear Ms. Davis:

The Illinois Environmental Protection Agency ("Illinois EPA") has completed a preliminary review of the provisional variance request, received on December 2, 1996, that you submitted on behalf of Chemetco, Inc. Pursuant to 35 Ill. Adm. Code 180.203, the Illinois EPA hereby rejects your application for provisional variance for the reasons listed below.

No statement identifying the regulations, Illinois Pollution Control Board orders or permit requirements Chemetco is seeking a provisional variance from was provided in the request. No assessment of any adverse environmental impact the provisional variance would produce was provided in the request. No timetable for completing the proposed compliance work was provided in the request, as well as no assurance that the work would be completed within the 45 day provisional variance period. No statement was provided as to the length of time, not to exceed 45 days, for which the provisional variance is sought. Finally, no statement as to whether Chemetco has received any other provisional variances within the past calendar year was provided.

Beyond the deficiencies noted above, the Illinois EPA rejects the provisional variance request because it fails to provide a definite compliance plan, including the date of completion and return to compliance. The request does not evaluate all reasonable compliance alternatives beyond that proposed, nor does it describe any adverse impacts from the variance and the extent of those impacts.

The above reasons for rejection are based both on the provisional variance request being incomplete under the requirements of 35 Ill. Adm. Code 180.202 and being outside the scope of relief provided by provisional variances applying the criteria in 35 Ill. Adm. Code 180.301. In accordance with 35 Ill. Adm. Code 180.203(b)(2), you are advised that you may apply to the Illinois Pollution Control Board for a variance pursuant to Section 35(a) of the Illinois Environmental Protection Act (415 ILCS 5/35(a)).

Page 2

If you have any questions regarding this matter, please contact Roger Callaway of my staff at the telephone number listed above.

Sincerely,

A handwritten signature in dark ink, appearing to read "K. R. Rogers", followed by a horizontal line extending to the right.

Kenneth R. Rogers, Manager  
Compliance Assurance Section  
Bureau of Water

March 20, 1997

Illinois Environmental Protection Agency  
Bureau of Water  
Compliance Assurance Section  
2200 Churchill Road  
P.O. Box 19276  
Springfield, IL 62794-9276

Attention: Mr. Roger Callaway  
Compliance Assurance Section

**RE: Provisional Variance Request - Chemetco, Inc., Hartford, Illinois  
Treated Effluent Discharge/NPDES Permit No. IL 0025747**

Dear Mr. Callaway:

CSD Environmental Services, Inc. (CSD) and Chemetco have received your letter dated December 6, 1996 regarding a provisional variance request for discharge of treated waters at Chemetco Inc. (Chemetco). We understand the Illinois Environmental Protection Agency (IEPA) has rejected a provisional variance for the emergency discharge of approximately 575,000 gallons of water into Long Lake (please note our original estimate of 1.2 MG has been revised).

Apparently our letter dated November 27, 1996 was misconstrued to be a request for a provisional variance when in fact we were requesting the Agency's assistance in finding discharge options for the water. In response to your December 6, 1997 letter, CSD, on behalf of Chemetco, is herein proceeding under 35 Ill. Adm. Code, Part 180 with a request for a provisional variance. Enclosed please find a complete application as required by Section 180.202.

If you have any questions please feel free to contact me at the number above.

Sincerely,

Cindy S. Davis  
President

cc: Greg Cotter, Chemetco  
George von Stamwitz, Armstrong, Teasdale, Schlafly & Davis

**APPLICATION FOR  
PROVISIONAL VARIANCE REQUEST  
NPDES PERMIT NO. IL 0025747**

**PREPARED FOR:**

**Chemetco, Inc.  
Route 3  
Hartford, Illinois 62048**

**MARCH 1997**

**APPLICATION OR PROVISIONAL VARIANCE REQUEST  
MARCH 17, 1997**

**CHEMETCO, INC.  
HARTFORD, ILLINOIS  
NPDES PERMIT NO. IL 0025747**

Chemetco, Inc. (Chemetco) is requesting a variance from Illinois Administrative Code, Title 35: Environmental Protection; Subtitle C: Water Pollution; Part 312: Treatment Plant Operator Certification for the operation of a treatment unit; Part 309 Permits; Subpart A: NPDES Permits for the discharge of treated water into Long Lake and Subpart B: Other Permits for the construction of a treatment unit. The variance has been prepared in accordance with 35 IAC, Subtitle A, Part 180.

*A description of the business or activity for which the variance is requested, including pertinent data on location, size, and the population and geographic area affected by the applicants operations:*

On September 17, 1996, Chemetco discovered a storm water discharge had occurred on the south portion of the plant from a storm water discharge pipe which was thought to have been disconnected. Refer to Figure 1 for the location of the spill area. The storm water discharge contained zinc oxide material, a by-product generated by the plant. The discharged material reached and impacted a nearby surface water body, Long Lake. To facilitate removal of the zinc oxide from Long Lake an application was submitted to the U.S. Army Corps of Engineers to construct a diversion channel and two dams. A permit for construction was granted by the Corps of Engineers on September 19, 1996. The diversion channel and dams were constructed and the impacted water from Long Lake was pumped in a temporary containment area, labeled Containment Area #2 on Figure 2, for temporary storage. Approximately 575,000 gallons of water is temporarily stored in Containment Area #2.

Chemetco is located within a primarily agricultural, light residential area south of Hartford and is bounded on the west by a major, heavily traveled, rail and highway (Route 3) and on the south by a limited use secondary road, Oldenberg Road. The 12 acre plant site is in the Southeast 1/4, Section 16, Township 4 North, Range 9 West, of the Third Principal Meridian, in Madison County. Refer to Figure 1 for a location map.

A variance is requested for: 1) the installation and operation of a portable/temporary treatment system to treat impounded water by means of the addition of a polymer to remove suspended solids and heavy metals from the wastewater; 2) discharge of the treated water into Long Lake; and 3) operation of the temporary treatment unit without an operator certification. Due to the time constraints of the NPDES permitting process, Chemetco is requesting permission from the Board to treat and discharge the waters contained in response to the zinc oxide spill, in order to prevent any further uncontrolled accidental discharges. Containment Area #2 is at 100% capacity and Chemetco is fearful that any additional precipitation will result in an uncontrolled, unpermitted discharge. The variance is only requested to cover discharges for the period of time prior to issuance of an NPDES and operating permit from the IEPA for the proposed permanent storm water treatment system. Within 60 days, Chemetco will be applying for an NPDES permit and a construction permit to allow

for the installation of a permanent wastewater treatment system designed to manage not only the remaining wastewaters associated with the zinc oxide spill containment and cleanup activities, but also the storm water runoff generated from the entire facility.

***The quantity and types of materials used in the process or activity for which the variance is requested, as appropriate:***

Chemetco proposes to treat the approximate 575,000 gallons of water impounded in Containment Area #2 through the addition of a polymer to remove the solids (and associated heavy metals) from suspension. Colloid Environmental Technologies Company (CETCO), Arlington Heights, Illinois has completed a treatability study on the contained waters for purposes of designing a temporary treatment system to meet the general effluent standards of 35 IAC, Subtitle C, Part 304. Attachment 1 provides a copy of the results of the treatability studies completed for this project.

Based upon the data generated from the treatability study, CETCO has developed a temporary treatment system design comprised of chemical coagulation/precipitation and filtration. A process flow diagram and outline identifying the general design criteria of the system is incorporated under Attachment 2. Figure 2 provides a site map identifying the location of the proposed temporary treatment system and the related outfall of the treated effluent.

For purposes of monitoring the system, Chemetco proposes to collect samples of the treated effluent waters during the initial startup of the system and weekly thereafter until the project is complete. In the event analysis reveals exceedence of the discharge limits, the system will be shutdown, subjected to evaluation and adjustment as necessary. During the re-startup of the system, additional sampling and analysis of the treated effluent will be completed to demonstrate compliance with effluent discharge standards. Analysis results of all sampling efforts associated with the temporary treatment system will be provided to the Agency.

***The quantity, types and nature of materials or emissions to be discharged, deposited or emitted under the variance, and the identification of the receiving waterway or land, or the closest receiving Class A and Class B land use, as appropriate:***

Approximately 575,000 gallons of treated water is proposed to be discharged into Long Lake. Refer to Figure 1 for the location of Long Lake. Long Lake is intermittent on Chemetco's property. The lake was dry on the east edge of Chemetco's property during the Fall of 1996. Figure 1 shows the location where the lake is dry on Chemetco's property.

***The quantity and types of materials in drinking water exceeding the allowable content, or other pertinent facts concerning variances from the Board's public water supply regulations.***

A sample of the untreated water was collected and analyzed for the NPDES discharge parameters specified in Chemetco's NPDES permit. Table 1 provides a summary of the sample results and a comparison to the General Effluent Standards as defined in 35 IAC, Subtitle C, Part 304. Exceedences of the standards were found for cadmium, copper, iron, manganese, lead, suspended solids, and zinc. Chemetco is proposing to treat the water to ensure compliance with the applicable standards prior to discharge.

***An assessment of any adverse environmental impacts which the variance may produce:***

No environmental impact is expected to occur from the discharge of this water. Only treated water is proposed to be discharged to Long Lake.

***A statement explaining why compliance with the Act, regulation or Board Order imposes arbitrary and unreasonable hardship:***

Due to time constraints of the NPDES permitting process, Chemetco is requesting permission from the Board to discharge this water prior to the IEPA granting an NPDES permit in order to prevent an uncontrolled accidental discharge. Containment Area #2 is currently at 100% capacity. Also, dewatering is necessary to remove the waste stockpiled in Containment Area #1. Water generated from the dewatering process will need to be added to Containment Area #2. Waste removal from Containment Area #1 cannot begin until the water temporarily stored in Area #2 is removed. Additionally, under similar argument, Chemetco is requesting the variance from the permit requirements of Subtitle C, Section 309 for the installation and operation of a temporary wastewater treatment system which will be required to treat the contained waters in order to meet the applicable effluent discharge standards.

A relief from the operator requirements of Section 312 is also requested due to the time constraints involved with the certification process itself. Chemetco proposes the assignment of an on-site plant employee who will be trained in the operation of this unit. This person will operate the temporary system under the direction and supervision of CETCO and will additionally apply for operator certification which will allow for his/her qualification in the operation of the temporary unit as well as the permanent wastewater treatment system proposed for construction. However, contingent upon the timeliness of the certification process, the designated operator may not be able to obtain certification prior to the initiation of the temporary treatment system's operation.

Chemetco will apply for a NPDES and construction permit for the installation of a permanent wastewater treatment system which will be designed not only to manage any residual wastewater generated from the subject spill's corrective action activities, but also designed to manage the entire plant's storm water run-off. Chemetco is requesting a provisional variance for the interim period

until the permanent treatment system is in operation. Chemetco only anticipates the treatment of the existing impounded waters at this time, however, heavy rains or continued corrective action (dewatering) activities may exceed the continued safe temporary containment capacity within this area and necessitate further pre-treated discharge under this variance.

***A description of the proposed methods to achieve compliance with the Act, regulations or Board Order, and a timetable for achieving such compliance:***

An NPDES permit and a construction permit application will be submitted within 60 days of the date of this letter for the installation of a permanent wastewater treatment system which will be designed to manage the remaining corrective action wastewaters generated from the spill response cleanup in addition to managing the entire plant's storm water runoff.

***A discussion of alternate methods of compliance and the factors influencing the choice of applying for a provisional variance:***

The site is not serviced by a sanitary sewer. Several wastewater treatment plants were contacted regarding acceptance of the wastewater. None of the plants would accept the water untreated. Plant personnel at Chemetco were interviewed to determine if the water could be used as non-contact cooling water. The plant can accept some of the water, but since storm water is also used as non-contact cooling water, the amount of water which can be used varies depending upon the amount of rainfall received at the plant. Plant personnel estimate it could take up to 3 years or longer to dewater Containment Area #2. The construction permit granted by the Army Corp of Engineers requires complete restoration of the property by September 19, 1997.

***A statement of the period, not to exceed 45 days, for which the variance is requested:***

A variance is requested for 45 days from the day the first discharge occurs. Chemetco proposes to notify the Agency within 10 days of the first discharge. An exact date of discharge cannot be provided at this time. Chemetco is anticipating the installation of the temporary treatment system within 15 days of the Board's approval of this variance. In the event additional discharges beyond that necessary to drain the existing impounded waters is required (prior to the installation and operation of the permanent wastewater treatment system), Chemetco will request an extension to the variance.

Chemetco is requesting this variance to prevent an uncontrolled accidental breaching of the impoundment.

*A statement of whether the applicant has been granted any provisional variances within the calendar year, and the terms and duration of such variances:*

Chemetco has not been granted any provisional variances within the past year.

*A statement regarding the applicants current permit status as related to the subject matter of the variance request:*

The applicant currently has an NPDES permit for discharge of storm water. A new application specific to the installation of a permanent on-site wastewater treatment system designed to manage the remaining wastewaters associated with the subject zinc oxide spill response activities, and to manage the entire plant's storm water runoff, will be submitted within 60 days of the date of this variance request.

*Any Board orders in effect regarding the applicant's activities and any matters currently before the Board in which the applicant is party:*

Chemetco currently has before the Board a petition for an adjusted standard under 35 Ill. Adm. Code 720.131(a) & (c). This petition is in regard to a pile of zinc oxide material stored at Chemetco and is not related to this variance request.

#### **LIST OF FIGURES AND ATTACHMENTS:**

Figure 1: Site Plan Map -- Spill Area

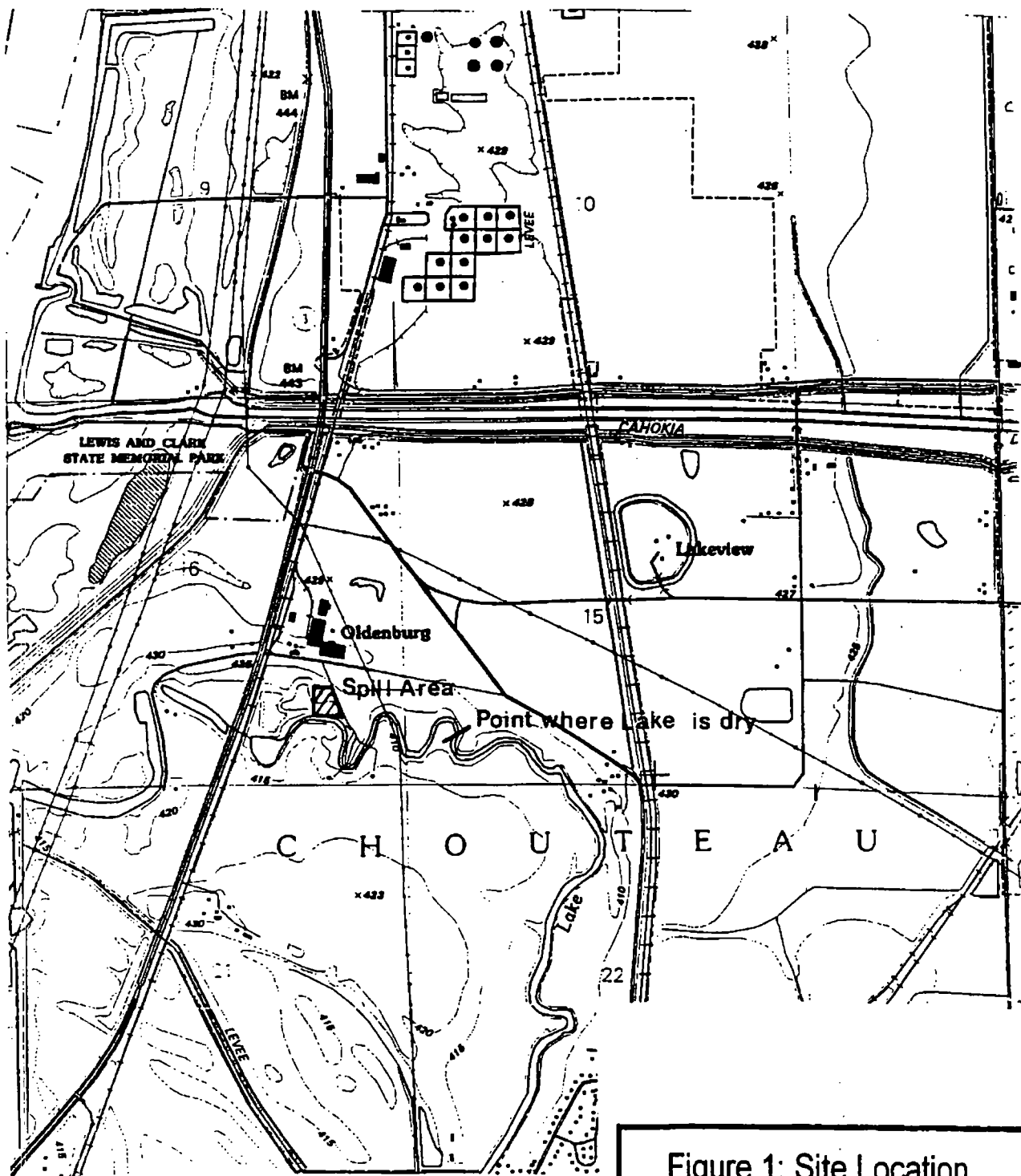
Figure 2: Spill Area Map & Location of Temporary Treatment System

Table 1: Water Sample Results -- Containment Area #2

ATTACHMENT 1: Treatability Test Results

ATTACHMENT 2: Treatment System Design Flowchart and Process Description

N  
SCALE 1"=2000'



Source: USGS Topographic Map  
Wood River, IL - 7.5'

Figure 1: Site Location

Chemetco, Inc. - Hartford

**CSD** Environmental  
Services, Inc.

**CHEMETCO, INC.**  
**Hartford, Illinois**

**TABLE 1**  
**Water Sample Result from Containment Area #2**  
**Collected on October 11, 1996**  
**Analyzed for NPDES Discharge Parameters**  
**Total Metals**

<b>Parameter</b>	<b>Result in mg/l</b>	<b>General Discharge Standard</b>
Silver	0.021	0.1
Boron	5.54	*
BOD	<7.5	30
Cadmium	0.563	0.15
Chlorine	<0.05	*
Copper	1.20	0.5
Iron	2.57	2.0
Hexane soluble Oil and Grease	11.5	15.0
Manganese	2.42	1.0
Nickel	0.14	1.0
Lead	1.59	0.2
Suspended Solids	67	15.0
Zinc	6.63	1.0

Those samples exceeding the General Use Standard as defined in 35 Ill. Adm. Code, Subtitle C, Part 304 are highlighted.

\* No standard has been established in 35 Ill. Adm. Code, Subtitle C, Section 304.

**PROVISIONAL VARIANCE REQUEST**

**Chemetco, Inc., Hartford, Illinois  
NPDES Permit No. IL0025747**

**ATTACHMENT 1:**

**Treatability Test Results**

**MARCH 1997**

ENVIRONMENTAL  
SYSTEMS

INCORPORATED

33 Lenexa

Business Center

9300 Pflumm Road

Lenexa, KS 66215

tel (913) 888-5060

fax (913) 888-2564

**Chemetco**  
*Proposed*  
**Temporary Impoundment  
Water Treatment  
Process Description**

**Primary Coagulant pH Adjustment Tank ( Primary Coagulation Tank):**

The waste water will be pumped at 200 to 300 gpm from the impoundment area to a primary pH adjustment tank. During the pumping process a primary coagulant (reagent "A") would be injected inline via metering pumps to aid in metals removal and increasing flocculation particle mass. Reagent "A" is a sodium bentonite clay based material selected for its ion exchange capabilities. In the dosage range of 75 to 150 ppm the exchange allows for increases in clarity and trace metals removal. Sulfuric acid and sodium hydroxide would be used to optimize the pH required for precipitation of the metals waste. During the laboratory bench scale the optimum metals removal occurred at 9.5 pH.

Waste water will flow from the Primary Coagulation Tank to the metals precipitation unit. Metals precipitation reagent "B" would be injected inline just after the Primary Coagulation Tank. Reagent "B" is an organic / inorganic heavy metal precipitant. Reagent "B" would be injected using a metering pump system to control dosage rates.

After the flocculant (reagent "C") has been injected via a metering pump, the preconditioned waste water will flow to the Metal Precipitation Unit. Reagent "C" will be both cationic and anionic in charge characteristics.

**Metal Precipitation Unit:**

The physical separation of the flocculated metals and the waste will take place during this operation. The separated sludge will be collected and transferred for further processing and the treated waste water will flow to the Post Treatment pH Adjustment Tank.

**Post Treatment pH Adjustment Tank:**

This tanks primary function is to maintain a pH level in accordance with the NPDES discharge requirements. The Post Treatment pH Tank will allow the primary treatment system to operate at any optimum pH level without the discharge pH limit dictating the pH of the treatment process. Sulfuric acid and sodium hydroxide will be used as pH adjustment reagents. Water will be pumped from the Post Treatment pH Adjustment Tank to a pair of polishing filters.

**Polishing filters:**

The polishing filters will be operated in a lead/lag manner. The primary unit will be in operation and the secondary unit will be placed into operation when the primary unit needs service, minimizing potential down time. The polishing filters will contain a media capable of obtaining the 15.0 ppm NPDES suspended solid discharge requirements.

**Batch Release Holding Tanks:**

These two tanks will be operated as batch release tanks. The batch release process would allow periodic sampling and/or testing of the accumulated cleaned waste water prior to discharge and assurance of NPDES parameter compliance.

**Dewatering:**

No further addition of treatment reagents should be needed for this operation. The dewatering process will be a mechanical separation (i.e. plate and frame filter press) of the solids and the liquids producing a solid with approximately 50 % dry solids. The solid material will be recycled at the Chemetco facility and the separated liquid would be returned to the primary treatment system for discharge.

**ENVIRONMENTAL  
SYSTEMS  
INCORPORATED**

38 Lenexa  
Business Center  
9900 Pflumm Road  
Lenexa, KS 66215  
Office (913) 888-6060  
Fax (913) 888-2564

**Chemetco**  
**Impoundment**  
**Bench test analytical**

**NPDES Requirements**

**Bench scale analytical**

Limits	Before treatment		After treatment	
	mg/l	mg/l	mg/l	mg/l below limit
Boron	none			
Cadmium	0.15	0.099	<.016	0.051
Copper	0.50	0.119	<.010	0.381
Iron	2.00	0.728	0.298	1.272
Lead	0.20	0.043	<.050	0.157
Manganese	1.00	0.579	0.246	0.421
Nickel	1.00			
Silver	0.10			
Zinc	1.00	2.05	0.094	1.050
O & G Hexane Method	15.00			
Suspended Solids	15.00			
BOD	30.00			
Chlorine	none			

**Bench scale testing results:**

All laboratory analysis were performed by a state certified analytical laboratory in accordance with EPA regulations and procedures.

Although suspended solids were not tested in the laboratory, it will require no alteration of the recommended process to comply with the NPDES requirement of 15.0 mg/l.

Blanks indicate no testing was performed.

KANSAS CITY • DALLAS • HOUSTON • EL PASO

**ENVIRONMENTAL  
SYSTEMS  
INCORPORATED**

38 Lenexa  
Business Center  
9900 Pillum Road  
Lenexa, KS 66215  
Office (913) 888-6060  
Fax (913) 888-2564

**Chemetco**  
**Impoundment**  
**Bench test analytical**

**NPDES Requirements**

**Bench scale analytical**

<b>Limits</b>	<b>Before treatment</b>		<b>After treatment</b>	
	<b>mg/l</b>	<b>mg/l</b>	<b>mg/l</b>	<b>mg/l below limit</b>
Boron	none			
Cadmium	0.15	0.099	<.016	0.051
Copper	0.50	0.119	<.010	0.381
Iron	2.00	0.728	0.298	1.272
Lead	0.20	0.043	<.050	0.157
Manganese	1.00	0.579	0.246	0.421
Nickel	1.00			
Silver	0.10			
Zinc	1.00	2.05	0.094	1.050
O & G Hexane Method	15.00			
Suspended Solids	15.00			
BOD	30.00			
Chlorine	none			

**Bench scale testing results:**

All laboratory analysis were performed by a state certified analytical laboratory in accordance with EPA regulations and procedures.

Although suspended solids were not tested in the laboratory, it will require no alteration of the recommended process to comply with the NPDES requirement of 15.0 mg/l.

Blanks indiate no testing was performed .

KANSAS CITY • DALLAS • HOUSTON • EL PASO

**PROVISIONAL VARIANCE REQUEST**

**Chemetco, Inc., Hartford, Illinois  
NPDES Permit No. IL0025747**

**ATTACHMENT 2:**

**Treatment System Design Flowchart and Process Description**

**MARCH 1997**





State of Illinois  
**ENVIRONMENTAL PROTECTION AGENCY**

Mary A. Gade, Director  
217/782-9720

2200 Churchill Road, Springfield, IL 62794-9276

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

March 31, 1997

Cindy S. Davis, President  
CSD Environmental Services, Inc.  
2220 Yale Boulevard  
Springfield, Illinois 62703

Re: Provisional Variance Request-Chemetco, Inc.-NPDES Permit No. IL0025747

Dear Ms. Davis:

The Illinois Environmental Protection Agency ("Illinois EPA") has completed a preliminary review of the provisional variance request, received on March 26, 1997, that you submitted on behalf of Chemetco, Inc. Pursuant to 35 Ill. Adm. Code 180.203, the Illinois EPA hereby rejects your application for provisional variance for the reasons listed below.

1. The Illinois EPA believes that the hardship in the petition is self-imposed due to Chemetco, Inc. being aware at least since November, 1996 of the need to apply for an NPDES permit modification and a construction permit application. The required permits could have been issued by the Illinois EPA if they were applied for during 1996.
2. Chemetco has indicated (page four) that they may be applying for a variance extension beyond the 45 day initial variance request. Title 35, Subtitle A, Subpart C, Section 180.301 states that a provisional variance cannot exceed 45 days in length.
3. The provisional variance request fails to provide a definite compliance plan, including the date of completion and return to compliance.

The above reasons for rejection are based on being outside the scope of relief provided by provisional variances applying the criteria in 35 Ill. Adm. Code 180.301. In accordance with 35 Ill. Adm. Code 180.203(b)(2), you are advised that you may apply to the Illinois Pollution Control Board for a variance pursuant to Section 35(a) of the Illinois Environmental Protection Act (415 ILCS 5/35(a)).

If you have any questions regarding this matter, please contact Roger Callaway of my staff at the telephone number listed above.

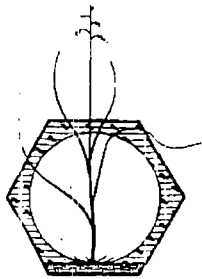
Sincerely,

Kenneth R. Rogers, Manager  
Compliance Assurance Section  
Bureau of Water

Chemetco, Inc.  
1198010003--Madison County  
Zinc Oxide Spill Remediation Plan  
April 1997

ATTACHMENT 8

TCLP Results



# Prairie Analytical Systems, Inc.

An Environmental and Agricultural Testing Laboratory



Page 1 of 1

CSD Environmental, Inc.  
2220 Yale Boulevard  
Springfield, IL 62703

Date Sampled: 18 February 1997  
Date Received: 19 February 1997  
Date Analyzed: 25 February 1997  
Date Reported: 26 February 1997

Project: Chemetco

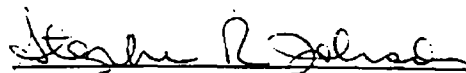
PAS Project Code: CSD-148

Sample Description: Woodpile

PAS Sample No.: 9702190699

## TCLP Metal Analysis

Parameters	Detection Limit mg/l	Result mg/l	E.P.A. Method	STORET Number	Regulatory Limit mg/l
Cadmium	0.005	1.10	6010A	99016	1.00
Lead	0.0075	7.15	6010A	99020	5.00
Zinc	5.0	59.9	6010A	99026	5.00

  
Stephen R. Johnson, Laboratory Director

P.O. Box 8326 • 205 Main Terminal • Capital Airport • Springfield, IL 62791-8326 • (217) 753-1148



Form PAS-TCLPIM

# Chain of Custody Record

Page \_\_\_ of \_\_\_

Prairie Analytical Systems, Inc. - 205 Main Terminal, Capital Airport - Springfield, IL 62707

Client	CSD ENVIRONMENTAL INC				Project	CHEMETCO	
Address	2220 YALB				Contact Person	M. SIMMERING / CINDY DAVIS	
City, State, Zip	SPRINGFIELD IL 62203				P. O. #/ Invoice to:	CSD ENV. INC.	
Phone Number	522-4045				Facsimile Number	522-4047	

Sample Description (10 Characters ONLY)	Sample Matrix	Sampling		Container		Preservative	Analysis Requested	PAS Sample Number
		Date	Time	Size	No.			
STORM WATER	H <sub>2</sub> O	2/18	P.M.	-	-	-	SEE ATTACHED PARAMETERS	0698
WOODPILE	Soil	2/18	P.M.	-	-	-	TCIA CADMIUM, LEAD, ZINC	0699
							<p>NOTE:</p> <p>DETECTION LIMIT FOR WOODPILE =</p> <p>CA &lt; 0.005 mg/L</p> <p>PB &lt; 0.0075 mg/L</p> <p>ZN &lt; 5.0 mg/L</p>	

Relinquished by: <u>Man Simmering</u>				Received by: <u>Scott Chum</u>			
Date: <u>2/19/97</u>		Time: <u>8:20</u>		Date: <u>2/19/97</u>		Time: <u>1420hrs</u>	
Relinquished by:				Received by:			
Date:		Time:		Date:		Time:	

SPECIAL INSTRUCTIONS:

PAS Project CODE: CSD-148

**Chemetco, Inc.**  
**1198010003—Madison County**  
**Zinc Oxide Spill Remediation Plan**  
**April 1997**

**ATTACHMENT 9**  
**Groundwater Sampling and Analysis Procedures**

## **1.0 Introduction**

This Sampling and Analysis (S&A) plan describes procedures and techniques for sample collection, sample preservation and shipment, analytical procedures, chain of custody control, and quality assurance for groundwater monitoring at Chemetco Inc.'s Hartford, Illinois facility. Copies of this plan will be distributed to personnel performing key tasks in the groundwater monitoring program, and a copy will be maintained onsite at the Chemetco facility. The written procedures of this plan will be followed by all Chemetco and contractor personnel involved in the monitoring program.

This sampling and analysis plan addresses procedures for Phase I groundwater monitoring at the Chemetco, Inc., facility at Hartford, Illinois. Additional discussion of the monitoring program is provided in Section 7 of this document.

Consistent sampling and analytical procedures are necessary to ensure the validity of groundwater monitoring data. The following items will be considered individually in this section:

- Sample collection procedures;
- Sample Preservation and handling;
- Chain of custody;
- Analytical procedures; and
- Quality assurance/quality control.

The goal of this program is accurate measurement of groundwater movement and to determine the presence or absence of hazardous constituents in the groundwater.

## **2.0 Sample Collection Procedures**

To ensure samples obtained from the monitoring well network are representative and that results from various sampling rounds are comparable, the following subsections describe procedures to be followed during sample collection.

### **2.1 Determination of Water Elevations**

Depth to groundwater is measured for each well prior to sampling, and is used to calculate the volume of water to be evacuated. Water elevation data will be evaluated to determine if the groundwater monitoring wells continue to be adequately located to provide representative upgradient and downgradient monitoring data.

Depth to standing water and the total depth of each well will be measured to the nearest 0.01 foot using an electronic water level indicator and a steel tape. Measurements are taken relative to the top of the casing which are surveyed and referenced to National Geodetic Vertical Datum (NGVD)

The presence and thickness of immiscible layers will be investigated in accordance with the USEPA's Technical Enforcement Guidance Document (TEGD) if either immiscible layers are known to occur or are determined to potentially occur after considering the waste types managed at the facility. At this time, the presence of immiscible layers is not anticipated.

### **2.2 Well Evacuation**

Standing water is removed from the well by bailing prior to sampling. The volume of water in the well is calculated using the initial water elevation, diameter of the well and total depth of the well. Figure 2.2.1 depicts a method for calculating the purge volume. Each well must be bailed until three well volumes have been removed or the well is dry and

field parameters have stabilized.

Bailing equipment consists of Teflon or stainless steel or disposable bailers and new polypropylene or nylon rope. Non disposable bailers will be thoroughly decontaminated between wells to avoid the potential for cross contamination. The bailer is detergent cleaned and acid rinsed prior to bailing; ropes are dedicated to each well. The cleaning procedure for the bailer consists of cleaning with a non-phosphate detergent followed by rinsing with dilute hydrochloric acid or nitric acid, then rinsing with tap water and finally, rinsing with Type II reagent grade water. All water removed from the well along with decontamination fluids will be appropriately containerized and disposed of upon receipt of laboratory analyses.

### **2.3 Sample Withdrawal**

Water elevations are measured to determine if recharge has been sufficient to collect samples from the well. Teflon, stainless steel, or disposable bailers should be used; the bailer should be cleaned and rinsed as described in Section 2.2. The bailer should be lowered into the well with a cable and samples should be collected within 24 hours after the wells are purged. Due to problems with high turbidity in some wells at the facility, Chemetco proposes to wait 24 hours before sampling due to past problems obtaining samples with very high turbidity. The upgradient well will be sampled first followed by the downgradient wells. The sampling should proceed as follows:

- Select a new or cleaned bailer.
- Check the operation of check valve assemblies to confirm free operation.
- Attach bailer to cable. The cable should be of sufficient length to allow for water-

level drawdown during sampling. Clean sampling equipment should not be placed directly on the ground. Use a drop cloth and feed the cable from clean reels. The cable should be wiped with deionized water and air dried before it is rewound onto the reel.

- Lower bailer slowly until it contacts the water surface.
- Allow bailer to sink and fill with minimal surface disturbance to minimize degassing of water.
- Slowly raise bailer to surface. Do not allow bailer line to contact ground. Place bailer line on protective liner.
- Open bottom emptying device to allow slow discharge and ensure the water flows gently down the side of the sample bottle with minimal entry turbulence. Measurements of pH, temperature, specific conductance, and turbidity should be obtained from the first sample.
- Repeat above steps as needed to acquire a sufficient sample volume to fill all containers.

Special care should be taken in transferring water from the bailer to sample containers so that the sample is not aerated. This is a concern for metal samples so that oxidation is avoided.

All information gathered during collection of groundwater samples should be recorded on a sample collection form, essentially the same as the one shown in Figure 2-3.

### **3.0. Sample Preservation and Shipment**

Groundwater samples must be preserved and analyzed properly to account for the instability of certain compounds. Proper preservation techniques and sample containers are necessary to ensure valid analyses. Table 3-1 specifies preservation and containerization requirements associated with parameters to be sampled for at Chemetco. In addition, the minimum sample volume required for analysis, as well as the maximum holding time, is given.

All samples will be placed in coolers immediately after collection and held at 4 degrees C. During all field activities sample blanks will be used to ensure sampling integrity. Blanks will be handled and analyzed according to the same procedures as other samples. All samples will be securely packed and expeditiously shipped in a sealed cooler to the laboratory designated for analysis.

### **4.0. Chain of Custody**

Proper sample tracking requires thorough documentation of all aspects of the sampling process from initial collection to laboratory analysis.

#### **4.1. Field Notebook**

To document field sampling procedures, the following information will be recorded in a field notebook:

- Well Identification;

- Well Depth;
- Name of collector;
- Date and time of well purging;
- The physical condition of each well, bailer and sampling location;
- Weather conditions, temperature;
- Purging and sampling conditions for the wells;
- Water level prior to purging;
- Observation of water appearance;
- Calibration of field measurement apparatus;
- Sample ID;
- pH of samples;
- Specific conductance of samples;
- Temperature of samples;
- Problems encountered and any deviation from the proposed groundwater monitoring plan

#### **4.2. Sample Labels**

Each sample will be identified with a unique identification number and labeled with a sample tag. The information recorded on the sample label includes;

- Well Number - the monitoring well identification;
- Date - a six-digit number indicating the year, month and day of collection;
- Time - a four-digit number indication the military time of collection;
- Sample number - a number that may include the above information, but that must distinguish among samples collected from the same sampling point at the same time;
- Sampler - Signature of person collecting the sample;
- Analyses required;
- Preservatives used; and
- Remarks - any pertinent observations or further sample description.

#### **4.3. Sample Seals**

When samples are shipped to a laboratory by a common carrier, shipping containers will be sealed with chain of custody tape. The tape will be signed and dated by the person applying the seal.

#### **4.4. Chain of Custody Record**

Samples are accompanied by a Chain-of-Custody Record (Fig 4.4) from the time

they are collected. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on record. This record documents sample custody transfer from the sampler, often through another person, to the analyst at the laboratory.

Minimum information recorded on the chain-of-custody record in addition to the signatures and dates of all custodians will include:

- Sample number;
- Signature of collector;
- Date and time of collection;
- Sample type (e.g., groundwater, immiscible layer);
- Identification of well;
- Number of containers;
- Parameters requested for analysis;
- Preservatives used;
- Internal temperature of shipping (refrigerated) container (chest) when samples were sealed into shipping container;
- Maximum temperature recorded during shipment;
- Minimum temperatures recorded during shipment; and

- Internal temperature of shipping (refrigerated) container upon opening in the laboratory.

The chain-of-custody record is employed in the following step-by-step procedure from sample collection to laboratory analysis:

1. Samples will be packaged properly for shipment and dispatched to the appropriate laboratory for analysis with a separate custody record accompanying each shipment. Shipping containers will be sealed with chain-of-custody tape for shipment to the laboratory. The chain-of-custody tape will be signed and dated by the person applying the seal. The method of shipment, courier name(s) and other pertinent information are entered in the "Remarks" box on the form.

The shipper's waybill or air bill is retained by the last custodian prior to shipment.

2. Whenever samples are split with another laboratory, it is noted in the "Remarks" section. The note indicates with whom the samples are being split and is signed by both the sampler and recipient. The split samples are thenceforth covered under separate chain-of-custody procedures. If either party refuses a split sample, this will be noted and signed by both parties. The person relinquishing the samples should request the signature of a representative of the receiving party, acknowledging receipt of the samples. If a representative is unavailable or refuses to sign, this is noted in the "Remarks" section. When appropriate, as in the case where the representative is unavailable, the custody record should contain a statement that the samples were delivered to the designated location at the designated time.

3. The original record will accompany the shipment, and a copy will be retained by the sampling technician.

4. The receiving laboratory's sample log should indicate the condition of the samples as received, and should explicitly state whether the chain-of-custody seal is intact.

5. The receiving laboratory should retain a copy of each chain-of-custody record, with the shipper's waybill or air bill attached.

#### **4.5. Sample Analysis Request Sheet**

A sample analysis Request Sheet will accompany each sample on delivery to the laboratory, and will identify the analyses to be performed on each sample container. The form will contain the sample number and location, the name of the person receiving the sample, analyses to be performed, date of sampling and sample receipt, addition of any preservatives, internal temperature of shipping container upon opening in the lab and the lab performing the analysis.

#### **4.6. Laboratory Notebook**

The laboratory performing the analytical work will maintain a notebook and will log the samples in upon receipt, making note of their condition and any problems that may exist, such as broken containers or missing sample labels, sample preservation techniques, instrumental methods, time, date, and name of the person performing each processing step and experimental conditions.

#### **5.0. Analytical Methods and Procedures**

All groundwater samples will be analyzed in the field, immediately after collection for temperature, pH and specific conductance. The conductivity meter and temperature meter will be calibrated according to manufacturer's instructions prior to each sampling period. The pH meter will be calibrated in the field, prior to and following each pH measurement using a fresh standard buffer solution. The results of calibrations and any

problems with the operation of equipment will be recorded in the field notebook.

All analyses specified in this groundwater monitoring plan will be conducted in accordance with EPA approved analytical procedures. An independent laboratory is proposed to be utilized for the analytical work to be performed on samples collected at Chemetco.

Table 5.1 lists the analytical procedures to be used for the analyses of groundwater samples. All samples must be analyzed within the holding times specified in Table 3.1. If, for some reason, a cited method cannot be used at the time of analysis, an equivalent approved method will be utilized that meets the performance applications.

#### **6.0. Quality Control/Quality Assurance Procedures Field and Lab**

Quality Control/Quality Assurance (QA/QC) procedures are conducted by sampling and analysis personnel to ensure the reliability and validity of data gathered. QAQC procedures include the explicit sample collection, preservation, analysis, and documentation requirements addressed in earlier sections of this plan, as well as the use of blanks, duplicates, spikes, and standards as described below.

##### **6.1. Field QAQC**

Field QAQC procedures include collection of sample duplicates and sampling equipment blanks. A minimum of one per twenty samples will be collected in duplicate. Duplicate samples will be identified as such of the Field Logsheet, but not on the labels or on the chain-of-custody forms. Information recorded on the labels and chain-of-custody forms for duplicates samples should be the same as for all other samples. Field duplicates are used to measure the precision associated with sampling, or the degree to which sample collection techniques affect the parameters to be measured.

Equipment blanks consist of a daily sample of final decontamination rinsate (D.I. water),

collected and recorded as above for the duplicates. The equipment blank is used to detect cross contamination via sampling equipment. If contamination is found in the blank, the source will be identified and corrective actions, including resampling, will be initiated.

## **6.2. Laboratory QAQC**

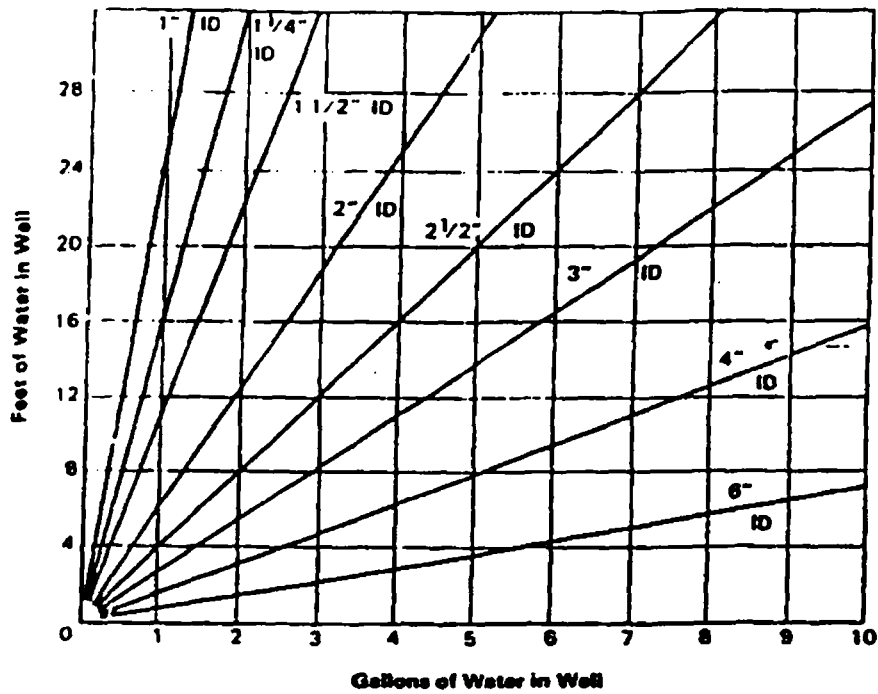
The laboratories performing the analyses for this program must ensure that adequate QAQC procedures are followed. The laboratories must check the precision and accuracy of analytical methods through the use of standards, duplicates, laboratory blanks and spiked samples.

The results of quality control analyses must be recorded in a laboratory notebook; the QC data can be used as a measure of performance and can also provide an indication of potential cross-contamination sources. If a problem is identified, the appropriate corrective action must take place. This may include checking instrumentation for calibration errors or defects; checking procedures; determining the quality and expiration date of reagents and checking calculations for possible errors.

## **7.0. Statistical Analysis**

Statistical procedures are not being proposed at this time since groundwater analyses will be compared to the appropriate 35 Ill. Admin. Code Part 620.

Figure 2-1  
Purge Volume Computation



(a) Graphical Explanation

Volume/Linear Ft. of Pipe		
ID(in)	Gal	Liter
1/4	0.003	0.010
3/8	0.006	0.022
1/2	0.010	0.039
3/4	0.023	0.087
1	0.041	0.154
2	0.163	0.618
3	0.367	1.39
4	0.653	2.47
6	1.47	5.56

(b) Volume Factors

FIGURE 2-2



Chemetco Environmental Management  
Groundwater Sampling Logsheet

For: \_\_\_\_\_ Monitoring Well: \_\_\_\_\_

Sampler: \_\_\_\_\_ Date: \_\_\_\_\_

STANDING VOLUME REMOVAL

Time: \_\_\_\_\_  
 Well Depth: \_\_\_\_\_ ft. Diameter of Well: \_\_\_\_\_ in.  
 Depth to water: \_\_\_\_\_ ft. Groundwater Elevation: \_\_\_\_\_  
 Length of Water Column: \_\_\_\_\_ ft.  
 Standing Well Volume: \_\_\_\_\_ gal.  
 Elevation Top of Casing: \_\_\_\_\_ ft.  
 Began Evacuation \_\_\_\_\_  
 Number of Balers removed: \_\_\_\_\_  
 Volume Expelled: \_\_\_\_\_ gal.  
 Bailed Dry? \_\_\_\_\_  
 Depth to Water (final) \_\_\_\_\_ ft.

GROUNDWATER SAMPLING

Sample Purpose: Background \_\_\_\_\_ Semi Annual \_\_\_\_\_  
 Quarterly \_\_\_\_\_ Annual \_\_\_\_\_

Time: \_\_\_\_\_  
 Began Sampling \_\_\_\_\_ Method of Collection \_\_\_\_\_  
 Sample Type \_\_\_\_\_ Container Type \_\_\_\_\_

Samples Collected: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Finished Sampling \_\_\_\_\_  
 Depth to Water (final) \_\_\_\_\_ ft.

ON-SITE ANALYSIS

pH: \_\_\_\_\_ Specific Conductance: \_\_\_\_\_ UMHO/CM (Corrected to 25°C)  
 Temp: \_\_\_\_\_ °C Analyst: \_\_\_\_\_

Instruments Used: pH: \_\_\_\_\_ Buffers: \_\_\_\_\_ and \_\_\_\_\_  
 Spec. Cond: \_\_\_\_\_ Standard: \_\_\_\_\_

Water Conditions: Odor: \_\_\_\_\_ Color: \_\_\_\_\_  
 Sedimentation: Yes or No \_\_\_\_\_ Sediment Color: \_\_\_\_\_

Weather: \_\_\_\_\_  
 Remarks/Observations: \_\_\_\_\_  
 \_\_\_\_\_

Signature Asserting Accuracy: \_\_\_\_\_

TABLE 3-1 SAMPLE CONTAINERS, PRESERVATION AND HOLDING TIMES

<u>Parameter</u>	<u>Sample Volume</u>	<u>Container</u>	<u>Preservation</u>	<u>Maximum Holding Time</u>
<u>Indicators of Ground Water Quality</u>				
pH	25 ml	Glass, plastic	Determine on site	Analyze immediately
Specific Conductance	100 ml	Glass, plastic	Determine on site	Analyze immediately
Total Organic Carbon	1000 ml	Amber glass with Teflon lined cap	HCl or H <sub>2</sub> SO <sub>4</sub> to pH <2; Cool 4°C.	28 days
Total Organic Halogens	1000 ml	Amber glass with	H <sub>2</sub> SO <sub>4</sub> to pH<2; Cool 4°C.	7 days
<u>Total Metals</u>				
Lead	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Cadmium	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Chromium	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Zinc	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Arsenic	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Tin	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Copper	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
<u>Additional Appendix IX Metals (In fourth quarter)</u>				
Antimony	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Barium	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Beryllium	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Cobalt	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Mercury	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Nickel	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Selenium	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Silver	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months
Vanadium	1000 ml	Plastic	HNO <sub>3</sub> to pH<2; Cool 4°C.	6 months

Table 3-1 (continued)

Semi-Volatile Organics (in fourth quarter)

All Appendix IX Semi-Volatiles

1000 ml

Glass

Cool, 4°C

TABLE 4-1 Analytical Procedures

<u>Indicators of Ground</u>	<u>Method No.<sup>2</sup></u>	<u>PQL<sup>1</sup></u>	<u>C.A.S. RN</u>
pH	9040	6-9	NA
specific conductance	9050	NA	NA
Total Organic Carbon	9060	NA	NA
Total Organic Halogen	9020	NA	NA

<u>Metals</u>	<u>Method No.</u>	<u>PQL</u>	<u>C.A.S. RN</u>
Antimony	7040	2000	Total
Arsenic	7060	10	Total
Barium	7080	1000	Total
Beryllium	7090	50	Total
Cadmium	6010	40	Total
Chromium	6010	70	Total
Cobalt	6010	70	Total
Copper	6010	60	Total
Lead	7421	10	Total
Mercury	7470	2	Total
Nickel	6010	50	Total
Selenium	6010	750	Total
Silver	6010	70	Total
Tin	7870	8000	Total
Vanadium	6010	80	Total
Zinc	6090	20	Total



**SAMPLES SENT TO:**

## הנה

### FIGURE 6-1